

# MATERIAL SAFETY DATA SHEET

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product:** TRI Reagent<sup>®</sup> RT, TRI Reagent<sup>®</sup> RT Blood, TRI Reagent<sup>®</sup> RT Liquid Samples  
**Cat. Nos.** RT 111, RB 211, RL 311

Molecular Research Center, Inc.  
5645 Montgomery Rd.  
Cincinnati, Ohio 45212  
USA 1-888-841-0900

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Product Name: Tri Reagent<sup>®</sup> RT, TRI Reagent<sup>®</sup> RT Blood, TRI Reagent<sup>®</sup> RT Liquid Samples  
Synonym: Phenol solution  
Chemical Formula: A formulation  
Molecular Weight: A formulation

CERCLA RATINGS: (scale 0-3) Health=3 Fire=1 Reactivity=0 Persistence=1  
NFPA RATINGS: (scale 0-4) Health=3 Fire=1 Reactivity=0  
HMIS RATINGS: (scale 0-4) Health=3 Fire=1 Reactivity=0 PPE=D\*

\* Use chemical fume hood or adequate ventilation.

CHEMTREC EMERGENCY NUMBER: Only in the event of an emergency involving a spill, leak, fire exposure or accident. USA: 1-800-424-9300; International 1-703-527-3887.

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Percent	RTECS #	DOT UN:
Phenol	108-95-2	<50	SJ3325000	282155
Nonhazardous Ingredients	NA 0004	<20		
Thiocyanate compounds	NA 0022	<30		

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## 3. HEALTH HAZARD IDENTIFICATION

**EFFECTS OF OVEREXPOSURE:** Prolonged exposure to phenol fumes or contact with skin can be hazardous and emergency medical attention should be initiated.

### ROUTES OF ENTRY:

Inhalation: Yes  
Skin: Yes  
Ingestion: Yes

**INHALATION:** (phenol) Corrosive, neurotoxin, highly toxic. May cause respiratory tract irritation, injury or arrest.

**ACUTE EFFECTS:** Inhalation may cause severe irritation of the mucous membranes, profuse sweating, headache, intense thirst, nausea and vomiting, abdominal pain, diarrhea, salivation, cyanosis, and convulsions. Methemoglobinemia and hemolysis have been reported occasionally. Death may occur from respiratory, circulatory or cardiac failure.

**CHRONIC EFFECTS:** Symptoms of chronic phenol poisoning may include vomiting, difficulty swallowing, diarrhea, anorexia, headache, vertigo, muscle weakness and pain, mental disturbances, dark or “smoky” urine and possible skin eruptions. Extensive damage to the liver and kidneys may be fatal.

**SKIN CONTACT:** (phenol) Corrosive, neurotoxin.

Dermal contact may irritate/inflame the skin, with burning sensation or localized loss of feeling (sensitizer, permeator). Skin is a principle route of entry and toxic quantities may be rapidly absorbed. The amount of tissue damage depends on the duration of exposure to the skin. Skin exposure can cause severe chemical burns. On skin, there is an initial local anesthesia followed with a white discoloration.

**ACUTE EFFECTS:** Contact may cause local anesthesia, skin necrosis, and burns. Phenol burns may be severe, but painless due to damage to nerve endings. Itching, scaling, reddening and occasionally blistering can characterize skin exposure. Vapors and liquids may be readily absorbed through the skin to cause systemic effects as detailed in acute inhalation exposure.

**CHRONIC EFFECTS:** Prolonged exposure may cause dermatitis, and skin sensitization. Coma and death have been reported following extensive skin exposure. Pathologic findings include congestion of the lungs, liver, spleen, and kidneys. Symptoms of chronic phenol poisoning may occur as detailed in chronic inhalation exposure. Animal studies indicate phenol may have tumor promoting and/or mutagenic capabilities.

**EYE CONTACT:** (phenol) Corrosive to tissue, may cause blindness.

**ACUTE EFFECTS:** May cause tearing, conjunctival swelling, loss of sensation and blurred vision.

**CHRONIC EXPOSURE:** Repeated or prolonged exposure to phenol vapors may cause corneal ulceration, permanent damage or blindness.

**INGESTION:** (phenol) May cause severe burns to the mouth or throat. May cause severe abdominal burning sensation.

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#### 4. FIRST AID

**INHALATION:** Immediately remove individual from exposure site to fresh air. If breathing has stopped, give artificial respiration. Maintain airway and blood pressure and administer oxygen if available. Treat symptomatically and supportively. Oxygen should be administered by qualified personnel. Get medical attention immediately.

**SKIN CONTACT:** Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (e.g. TRI Reagent odor). Use a deluge shower for at least 15 minutes. In case of chemical burns, cover area with sterile, dry dressing, bandage securely, but not too tightly. Get medical attention immediately.

**EYE CONTACT:** Wash eyes immediately with large amounts of water, holding upper and lower lids open. Get medical attention immediately.

**INGESTION:** Wash out mouth if vomiting occurs, have person lean forward with head down to avoid breathing in vomit. Do not induce vomiting unless directed to do so by medical personnel. Have conscious person drink several glasses of milk or water. Seek immediate hospital medical attention.

**Note to attending physician:** No known specific antidote. Areas of skin contact smaller than 100 cm<sup>2</sup> may cause a minor health hazard. Systemic doses less than 1 gm may cause a minor health hazard although individual sensitivity may vary. For ingestion exposure: give castor oil or other vegetable oil. Give charcoal slurry if conscious. Treat symptomatically. Observe for 24 hrs. Be prepared for emergency cardiovascular intervention.

## 5. FIRE FIGHTING MEASURES

Moderate fire hazard when exposed to heat or flame. Vapor-air mixtures are explosive above flash point. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Fires involving phenol should be fought upwind from the maximum distance possible. In the absence of a contained breathing device, emergency personnel should stay away from low areas and ventilate closed spaces before entry.

**EXTINGUISHING MEDIA:** Use Class B extinguishers (oils, hydrocarbon liquids.) Dry chemical, carbon dioxide, halon, water spray or standard foam (1987 Emergency Response Guidebook, DOT P 5800.4) for larger fires, use water spray, fog or standard foam (1987 Emergency Response Guidebook, DOT P 5800.4).

**FIREFIGHTING:** Evacuate area. Wear positive pressure self-contained breathing apparatus. Extinguish fire using indicated agents. Phenol is combustible and containers may explode in fire. Avoid breathing toxic fumes produced under fire conditions.

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## 6. ACCIDENTAL RELEASE MEASURES

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

**PERSONAL PROTECTIVE EQUIPMENT:** Use gloves, boots, Tyvek suit or other impervious covering to avoid skin contact. Use chemical goggles, face shield, or other appropriate eye protection.

**SPILL AND LEAK PROCEDURES:** Restrict persons not wearing protective equipment from area. Remove all ignition sources. Neutralize spill with slaked lime, sodium bicarbonate or crushed limestone. Collect powdered material and deposit in sealed containers and dispose of phenol as hazardous waste. Isolate area and deny entry.

U.S. DOT EMERGENCY GUIDE # 60

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK # 153

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## 7. HANDLING AND STORAGE

Observe all Federal, state, and local regulations when storing or disposing of this substance. Store in an area appropriate for flammables; a cool, dry, well-ventilated location, away from direct sunlight, heat or sources of ignition. Avoid contact with hypochlorite, strong oxidizers such as chlorine and bromine.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

The current OSHA permissible exposure limit (PEL) for phenol is 5 ppm (19 milligrams per cubic meter) as an 8-hour time-weighted average (TWA) concentration. Use engineering controls to keep air borne levels below exposure limit (the human olfactory phenol detection limit is about 5 ppm).

### GENERAL PROTECTION AND PRECAUTIONS

**PROTECTIVE MEASURES:** Do not touch unprotected skin. Do not wear contact lenses while handling this product. Do not pipette by mouth. Area ventilation is generally adequate, but use fume hood if available.

**AIR PURIFYING RESPIRATOR CANISTERS / CARTRIDGES:** Stacked cartridge for organic vapors (black ANSI color code, NIOSH approved) plus dust, mist (red ANSI color code, NIOSH approved).

**GLOVES AND PROTECTIVE CLOTHING:** Employee must wear appropriate (impervious) clothing and gloves (rubber or neoprene rubber) to prevent any possibility of skin contact with this substance.

**EYE PROTECTION:** Safety glasses should be the minimum eye protection. Wear chemical goggles to reduce exposure to aerosols or mists.

**EMERGENCY WASH FACILITIES:** Where there is any possibility that an employee's eyes and /or skin may be exposed to this substance, the employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

**ROUTINE OPERATIONS:** Lab coats, safety glasses with side shields and gloves should be considered minimum body protection. Wash hands thoroughly after using the reagent and never eat, drink, use tobacco products, apply cosmetics or take medications in areas where a phenol solution is handled, processed or stored. Always wash hands after using the reagent.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Description:	Red to maroon color with a characteristic sweet, medicinal or tar-like odor.
Boiling point:	Not determined
Melting point:	Not Applicable
Vapor pressure:	>0.35 mmHg@25C
Evaporation rate:	Not determined
Solvent solubility:	Soluble in water and glycerol; relatively soluble in aqueous alkali hydroxides, and dimethyl sulfoxide.

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## 10. STABILITY AND REACTIVITY

**STABILITY:** Stable under normal temperatures and pressures.

**INCOMPATIBILITIES:** Acetaldehyde: violent reaction.

Aluminum and alloys: may corrode.

Aluminum chloride + nitrobenzene: violent explosion.

1,3-butadiene, boron trifluoride, and diethyletherate: possible explosion

Calcium hypochlorite: exothermic reaction with possible ignition.

Formaldehyde: possible exothermic reaction.

Lead and alloys: may corrode.

Magnesium and alloys: may corrode.

**OXIDIZERS: (strong)** Fire and explosion hazard.

Peroxodisulfuric acid: possible explosion.

Peroxomonosulfuric acid: explosion.

Plastics and rubber coatings: may corrode.

Sodium nitrate + trifluoroacetic acid: violent exothermic reaction.

Sodium nitrite: may explode.

Zinc and alloys: may corrode.

**DECOMPOSITION:** Thermal decomposition products may include toxic oxides of carbon.

Polymerization: Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

**CORROSIVITY:** Slightly corrosive in the presence of stainless steel. Non-corrosive in glass or polypropylene containers.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA: Human:** (phenol) 10 mg/kg oral-human LDLO. **Rat:** (phenol) 317 mg/ kg LD50 oral; TRI Reagent<sup>c</sup>RT oral LD50 1620 mg/kg, dermal LD50; >1000 mg/kg. **Mouse:** (phenol) 270 mg/kg LD50 oral. DOT Dermal Toxicity Test, 49CFR 173.137, Class 8, Packing Group II Corrosive.

### Consensus Exposure Guidelines

OSHA permissible exposure limit (PEL): (phenol) 5 ppm (19 mg / m<sup>3</sup>) as an 8-hour time-weighted average. Skin notation.

NIOSH recommended exposure limit (REL): (phenol) 5 ppm (19 mg / m<sup>3</sup>) as a time-weighted average for up to a 10-hour workday and a 40-hour workweek. Short-term exposure limit (STEL): 15.6 ppm (60 mg / m<sup>3</sup>) for periods not to exceed 15 minutes. Skin Notation.

ACGIH TLV: (phenol) 5 ppm (19 mg / m<sup>3</sup>) as a time-weighted average for up to a 8-hour workday and a 40-hour workweek. Skin Notation.

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## 12. ECOLOGICAL INFORMATION

**ECOTOXICOLOGICAL INFORMATION:** Short-term toxic effects are expected to be limited to the immediate area of environmental release, and will be most pronounced in microorganisms. **Environmental fate:** Expected to rapidly decompose in the environment. **Environmental Movement and Partitioning:** Short-term movement could be due to high water solubility. Movement expected to be limited by relatively rapid environmental detoxification. Expected to partition strongly into aqueous environmental components.

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## 13. DISPOSAL CONSIDERATIONS

EPA WASTE NUMBER (RCRA HAZARD CLASS) U188. All waste disposal activities are subject to federal, state and local laws and regulations. Handle as hazardous waste by keeping in sealed containers until final disposal in a hazardous waste incinerator.

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## 14. TRANSPORTATION INFORMATION

Department of Transportation Hazard Classification (DOT) 49CFR172.101; CORROSIVE LIQUID, N.O.S.; UN1760  
Department of Transportation Labeling requirements 49CFR172.101; CLASS 8 PACKING GROUP II, PACKING INSTRUCTIONS 808

Department of Transportation Packaging requirements 49CFR173.202; EXCEPTIONS: 49CFR173.154  
Shipping designation: (TRI Reagent: guanidine thiocyanate-phenol solution).

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## 15. REGULATORY INFORMATION

OSHA: Classified as A HAZARDOUS CHEMICAL@ under US OSHA HAZCOM REGULATION.

TSCA: Some constituents of this product included in US EPA Toxic Substance Control Act (40 CFR part 710).

SARA SECTION 302 Threshold Planning Quantity: 500/10,000 lbs.

SARA SECTION 304 Reportable quantity: 1000 lbs.

CERCLA SECTION 103 Reportable quantity: 1000 lbs.

SUBJECT TO SARA SECTION 313 Annual toxic chemical release reporting.

EUROPEAN UNION:

