1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product code  QP020  
Product name  RNAzol® RT RNA Isolation Reagent

Contact manufacturer

GeneCopoeia, Inc.
9620 Medical Center Drive, Suite 101
Rockville, MD 20850
USA

Phone: 301-762-0888
Toll free: 1-866-360-9531
Fax: 301-762-3888

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>30-60</td>
</tr>
<tr>
<td>Guanidine isothiocyanate</td>
<td>593-84-0</td>
<td>15-40</td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>1762-95-4</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.

3. HAZARDS IDENTIFICATION

GHS – Classification

Signal Word
DANGER

Health Hazards

<table>
<thead>
<tr>
<th>Health Hazard</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Category 4</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>Category 4</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity - Vapors</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin corrosion/irritiation</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 (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Specific target organ systemic toxicity (repeated exposure)</td>
<td>Category 3</td>
</tr>
</tbody>
</table>
Health Hazards (continued)

| Mutagenicity | Mutagenic category 2 |

Physical hazards
Not hazardous

Hazard Statements
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
H302 - Harmful if swallowed
H312 - Harmful in contact with skin
H332 - Harmful if inhaled
H335 - May cause respiratory irritation

Precautionary Statements
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P301 + P330 + P311 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P308 + P313 - IF exposed or concerned: Get medical advice/attention
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection

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 | Causes burns. Possible risk of irreversible effects. Harmful in contact with skin. Irritating to skin and mucous membranes. |
| Inhalation | Harmful by inhalation. |
| Ingestion | Harmful 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>

4. FIRST AID MEASURES

Skin contact
Wash off immediately with soap and plenty of water while 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 center immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

Inhalation
Remove to fresh air. Call a physician or poison control center 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 protection equipment. Avoid contact with skin, eyes or 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. 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.

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 more information

7. HANDLING AND STORAGE
Handling
Always wear recommended Personal Protective Equipment. Avoid contact with skin, eyes or clothing. Remove all sources of ignition.

Storage
Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Protect from sunlight.

### 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>5 ppm</td>
<td>19 mg/m³</td>
<td>5 ppm</td>
<td>None</td>
</tr>
<tr>
<td>Guanidine isothiocyanate</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>5 mg/m³</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Engineering measures
Use in a chemical fume hood

#### Personal protective equipment
Personal Protective Equipment requirements are dependent on the user institution's risk assessment and are specific to the risk assessment for each laboratory where this material may be used.

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

#### Respirotor Recommendations, National Institute of Occupational Safety and Health, U.S.

- **Up to 50 ppm**

  (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.
  - (APF = 10) Any supplied-air respirator
  - Up to 125 ppm:
    - (APF = 25) Any supplied-air respirator operated in a continuous-flow mode.
  - Up to 250 ppm:
    - (APF = 50) Any air-purifying full-facepiece respirator equipped with organic vapor cartridge(s) in combination with an N100, R100, or P100 filter.
    - (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.
    - (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.
    - (APF = 50) Any self-contained breathing apparatus with a full facepiece.
    - (APF = 50) Any supplied-air respirator with a full facepiece.
    - Emergency or planned entry into unknown concentrations or IDLH conditions:
    - (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.
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.

Escape:
(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.

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

Eye protection
Tight sealing 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 or clothing. Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure
Prevent product from entering drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

<table>
<thead>
<tr>
<th>Form</th>
<th>Liquid.</th>
</tr>
</thead>
<tbody>
<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 °C</td>
<td>No data available °F</td>
</tr>
<tr>
<td>Melting point/range °C</td>
<td>No data available °F</td>
</tr>
<tr>
<td>Flash point °C</td>
<td>No data available °F</td>
</tr>
<tr>
<td>Autoignition temperature °C</td>
<td>No data available °F</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

Hazardous decomposition
Toxic gas. Sulphur oxides. Hydrogen cyanide (hydrocyanic acid). Carbon oxides,

Products
Nitrogen Oxides.

Polymerization
Hazardous polymerization 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>=316mg/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>
</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
Causes burns. Possible risk of irreversible effects. Harmful in contact with skin. Irritating to skin and mucous membranes.

Inhalation
Harmful by inhalation

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

Chronic aquatic toxicity
Category 3

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</td>
<td>Desmodesmus subspicatus EC50 187 - 279 mg/L (72 h) Pseudokirchneriella subcapitata EC50 46.42 mg/L (96 h)</td>
<td>Daphnia magna EC50 4.24 - 10.7 mg/L (48 h) Daphnia magna EC50 10.2 - 15.5 mg/L (48 h)</td>
<td>=316mg/m3(Rat)</td>
<td></td>
<td>logPow1.47</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Dispose of contents/containers in accordance with local regulations.

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: 1760
ERG Code: 153

15. REGULATORY INFORMATION

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

US 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>
<tr>
<td>Ammonium thiocyanate</td>
<td>1762-95-4</td>
<td>7-13</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>
<tr>
<td>Ammonium thiocyanate</td>
<td>1762-95-4</td>
<td>7-13</td>
<td>Present (XCN where X=H or any other group where a formal dissociation may occur. For example KCN or Ca(CN)2)</td>
</tr>
</tbody>
</table>

US 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>Guanidine isothiocyanate</td>
<td>-</td>
<td>-</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>Listed</td>
<td>Listed</td>
</tr>
</tbody>
</table>

California Proposition 65

This product does not contain any Proposition 65 chemicals.

WHMIS Hazard Class

D1A - Very toxic materials
E - Corrosive material
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.

16. OTHER INFORMATION

Reason for revision
Not Applicable. 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.

THE INFORMATION IN THIS SDS DOES NOT CONSTITUTE A WARRENTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE"

End of Safety Data Sheet