IDENTIFICATION

MSDS Record Number: 5618722
Product Name(s): TRIS REAGENT SOLUTION
Product Identification: MSDS NUMBER: T7114
                      PRODUCT CODE: 5952
                      C.A.S. NUMBER: 77-86-1
Date of MSDS: 2004-02-12
Currency Note: This MSDS was acquired from the supplier on 2007-09-06.

MANUFACTURER/SUPPLIER INFORMATION

Company: MALLINCKRODT BAKER INC

MATERIAL SAFETY DATA

Effective Date: 02/12/04
Supercedes: 05/17/01

MSDS MATERIAL SAFETY DATA SHEET
From: Mallinckrodt Baker, Inc.
      222 Red School Lane
      Phillipsburg, NJ 08865

Emergency Telephone Number: 908-859-2151

NOTE: Use CHEMTREC and CANUTEC phone numbers only in the event of a chemical emergency.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.
J. T. B A K E R

TRIS REAGENT SOLUTION

1. Product Identification
   Synonyms: TRIS; 2-Amino-2-(hydroxymethyl)-1,3-propanediol; THAM;
              Tricine; TRIS (Base); Trisamine solution
   CAS No: 77-86-1
   Molecular Weight: 121.14
   Chemical Formula: C6H15N3O7
   Product Codes: 5952

2. Composition/Information on Ingredients

Ingredient | CAS No | Percent | Hazardous
--- | --- | --- | ---
Tris | 77-86-1 | 19 - 21% | Yes
Water | 7732-18-5 | 79 - 81% | No

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

<table>
<thead>
<tr>
<th>Health Rating</th>
<th>Flammability Rating</th>
<th>Reactivity Rating</th>
<th>Contact Rating</th>
<th>Lab Protective Equip</th>
<th>Storage Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Slight</td>
<td>1 - Slight</td>
<td>1 - Slight</td>
<td>2 - Moderate</td>
<td>GOGGLES; LAB COAT</td>
<td>Orange (General Storage)</td>
</tr>
</tbody>
</table>

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath.

Ingestion:
Mild alkali. Causes irritation and reddening to the mucous membranes of the mouth, esophagus, and gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Large oral doses may cause weakness, collapse, blood clotting and coma. Estimated lethal dose: 50 grams.

Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain.

Eye Contact:
Causes irritation, redness, and pain.

Chronic Exposure:
Chronic dermatitis may follow skin contact.

Aggravation of Pre-existing Conditions:
No information found.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention.

Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.

Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures
Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage
Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection
Airborne Exposure Limits:
None established.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

Personal Respirators (NIOSH Approved):
For conditions of use where exposure to the substance is apparent and engineering controls are not feasible, consult an industrial hygienist.

For emergencies, or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties
Appearance: Clear, colorless solution.

Odor: Slight characteristic odor.

Solubility: No information found.

Density: No information found.

pH: No information found.

Boiling Point: No information found.

Melting Point: No information found.

Vapor Density (Air=1): No information found.

Vapor Pressure (mm Hg): No information found.

Evaporation Rate (BuAc=1): No information found.

% Volatiles by volume @ 21C (70F): No information found.
10. Stability and Reactivity

Stability:
stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
burning may produce carbon monoxide, carbon dioxide, nitrogen oxides.

Hazardous Polymerization:
will not occur.

Incompatibilities:
copper, brass, aluminum, and oxidizing agents.

Conditions to Avoid:
heat, incompatibles.

11. Toxicological Information

Tris: oral rat LD50: 5900 mg/kg.

--- Carcinogen ---

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>NTP Known</th>
<th>Carcinogenicity</th>
<th>IARC Category</th>
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<tbody>
<tr>
<td>Tris (77-86-1)</td>
<td>No</td>
<td>No</td>
<td>None</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>No</td>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--- Chemical Inventory Status - Part 1 ---

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>TSCA</th>
<th>EC</th>
<th>Japan</th>
<th>Australia</th>
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<tbody>
<tr>
<td>Tris (77-86-1)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</table>

--- Chemical Inventory Status - Part 2 ---

--- Canada ---

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Korea</th>
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<th>NDSL</th>
<th>Phil.</th>
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<tbody>
<tr>
<td>Tris (77-86-1)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

--- Federal, State & International Regulations - Part 1 ---

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>RQ</th>
<th>TPQ</th>
<th>List</th>
<th>Chemical Catg.</th>
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</thead>
<tbody>
<tr>
<td>Tris (77-86-1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>No</td>
<td>No</td>
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<td>No</td>
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</table>
Ingredient:

<table>
<thead>
<tr>
<th></th>
<th>CERCLA 261.33</th>
<th>TSCA 8 (d)</th>
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<tbody>
<tr>
<td>Tris (77-86-1)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Water (7732-18-5)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Chemical Weapons Convention: No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SARA 311/312: Acute: Yes Chronic: No</td>
<td>Fire: No</td>
<td>Pressure: No</td>
</tr>
<tr>
<td>Reactivity: No</td>
<td>(Mixture / Liquid)</td>
<td></td>
</tr>
</tbody>
</table>

Australian Hazchem Code: None allocated.
Australian Poison Schedule: None allocated.

WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings:
Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Use only with adequate ventilation.
Keep container closed.
Avoid breathing mist.

Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:
Laboratory Reagent.

Revision Information:
No Changes.

Disclaimer:

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