1. Product and company identification

Product name: Luminol/Enhancer Solutions
Synonym: ChemiFast
Company: Synoptics Ltd
   Syngene
   Beacon House
   Nuffield Road
   Cambridge
   United Kingdom
   CB4 1TF
Product number: CH-FAST/20; CH-FAST/100
MSDS #: 01
Validation date: 21/05/2010
Print date: 21/05/2010
Responsible name: Sales department
In case of emergency: +44 1223727123

Use of:
Refer to the Instruction booklet for proper intended use. Otherwise, contact supplier for specific applications.

2. Hazards identification

Physical state: Liquid [Clear sparkling liquid]
OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)
Emergency Overview:
WARNING
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAYBE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Harmful if swallowed. Irritating to eyes, respiratory system and skin. Avoid exposure –obtain special instructions before use. Do not breathe vapour or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that can cause target organ damage. Use only adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry: Eye contact, Inhalation and Ingestion

Potential acute health effects
Inhalation: Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion: Harmful if swallowed
Skin: Irritating to skin
Eyes: Irritating to eyes.

Potential chronic health effects
Chronic effects: Contains material that can cause target organ damage
Carcinogenicity: No known significant effects or critical hazards
Mutagenicity: No known significant effects or critical hazards
Teratogenicity: No known significant effects or critical hazards
Developmental effects: No known significant effects or critical hazards
Fertility effects: No known significant effects or critical hazards

Target organs: Contains material which causes damage to the following organs: kidneys, liver, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea. Contains material which may cause damage to the following organs; the nervous system, cardiovascular system.

Over-exposure signs/symptoms
Inhalation: Adverse symptoms may include the following: respiratory tract irritation, coughing
Ingestion: No specific data.
Skin: Adverse symptoms may include the following: Irritation, redness
Eyes: Adverse symptoms may include the following: pain or irritation, watering, redness

Medical conditions: Pre-existing digestive disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

The preparation is not classified as dangerous according to directive 1999/45/EC and its amendments.

Classification: Not specified

See toxicological information (Section 11)
Luminol/Enhancer Solutions

3. Composition/information on ingredients

United states

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
<th>EC number</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tris (Tris(hydroxymethyl)aminomethane)</td>
<td>77-86-1</td>
<td>1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>107-21-1</td>
<td>1-3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Europe

<table>
<thead>
<tr>
<th>Substance/preparation</th>
<th>Ingredient name</th>
<th>CAS number</th>
<th>%</th>
<th>EC number</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ethylene Glycol</td>
<td>107-21-1</td>
<td>1-3</td>
<td>203-473-3</td>
<td>Xn; R22 [1] [2]</td>
</tr>
</tbody>
</table>

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as Hazardous to health or the environment and hence require reporting in this section.

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit

Occupational exposure limits, if available, are listed in section 8.

4. First aid measures

Inhalation: Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Ingestion: Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

5. Fire-fighting measures

Flammability of the product: In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable: Use an extinguishing agent suitable for the surrounding fire.
Not Suitable: None known.

Special exposure hazards: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous combustion products: Decomposition products may include the following materials:
- Carbon oxides
- Nitrogen oxides

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
6. Accidental release measures

Personal precautions: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (section 8).

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Small spill: Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling: Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well ventilated area, away from incompatible materials (See section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Product name</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td></td>
</tr>
<tr>
<td>ethanediol</td>
<td>ACGIH TLV (United states, 1/2008).</td>
</tr>
<tr>
<td></td>
<td>C:100 mg/m³ Form: Aerosol</td>
</tr>
<tr>
<td></td>
<td>CEIL: 125 mg/m³</td>
</tr>
<tr>
<td></td>
<td>EU OEL (Europe, 5/2006) Skin notes: Indicative</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
</tr>
<tr>
<td>ethanediol</td>
<td>Short term limit value: 104mg/m³ 15 minute (s)</td>
</tr>
<tr>
<td></td>
<td>Short term limit value: 40ppm 15 minute (s)</td>
</tr>
<tr>
<td></td>
<td>Limit value: 52mg/m³ 8 hour(s)</td>
</tr>
<tr>
<td></td>
<td>Limit value: 20 ppm 8 hour (S)</td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapour or mist., use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
8. Exposure controls/personal protection

**Hygiene measures:** Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal protection**

**Respiratory:** Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

**Hands:** Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**Eyes:** Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

**Skin:** Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Environmental Exposure control:** Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

**Physical state:** Liquid (Clear sparkling liquid.)

**Colour:** Colourless. Light pink

**pH:** 9.5

**Solubility:** Easily soluble in the following materials: cold water and hot water.

10. Stability and reactivity

**Chemical stability:** This product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

**Conditions to avoid:** No specific data.

**Incompatible materials:** No specific data.

**Hazardous decomposition products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Possibility of hazardous reactions:** Will not occur.

11. Toxicological information

**United States**

**Acute toxicity**

<table>
<thead>
<tr>
<th>Product /ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-propanediol, 2-amino-</td>
<td>LD50 Dermal</td>
<td>Rabbit</td>
<td>9530 uL/kg</td>
<td>-</td>
</tr>
<tr>
<td>-2-(hydroxymethyl)-ethanediol</td>
<td>LD50 Intravenous</td>
<td>Rat</td>
<td>1800 mg/kg</td>
<td>-</td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>5900 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4700 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4000 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2800 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Unreported</td>
<td>Rat</td>
<td>3260 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Intavenous</td>
<td>Rat</td>
<td>4700 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>4000 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>2800 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>3000 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>LD50 Oral</td>
<td>Rat</td>
<td>120 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>TDLo Oral</td>
<td>Rat</td>
<td>1110 mg/kg</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>TDLo Oral</td>
<td>Rat</td>
<td>5000 mg/kg</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion/Summary:** Not available

**Chronic toxicity**

**Conclusion/Summary:** Not available

**Carcinogenicity**

**Conclusion/Summary:** Not available

21/05/2010
11. Toxicological information

**Classification**

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>EPA</th>
<th>NIOSH</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-propanediol, 2-aminoo-2-(hydroxymethyl)-ethanediol</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>None</td>
<td>-</td>
<td>None</td>
</tr>
<tr>
<td>Ethanediol</td>
<td>A4</td>
<td>-</td>
<td>-</td>
<td>None</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>

**Mutagenicity**

**Conclusion/Summary:** Not available

**Teratogenicity**

**Conclusion/Summary:** Not available

**Reproductive toxicity**

**Conclusion/Summary:** Not available

**Europe**

**Chronic effects:** No known significant effects or critical hazards

**Carcinogenicity:** No known significant effects or critical hazards

**Mutagenicity:** No known significant effects or critical hazards

**Teratogenicity:** No known significant effects or critical hazards

**Developmental effects:** No known significant effects or critical hazards

**Fertility effects:** No known significant effects or critical hazards

12. Ecological effects

**Environmental effects:**

**United States**

**Aquatic ecotoxicity**

**Conclusion/Summary:** Not available

**Other adverse effects:** No known significant effects or critical hazards

13. Disposal considerations

**Waste disposal:** The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Dispose of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

**Hazardous Waste:** Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by the EU directive 91/689/EEC. Disposal should be in accordance with applicable regional, national and local laws and regulations. Refer to section 7: HANDLING AND STORAGE and section 8: EXPOSURE CONTROLS/PERSOAL PROTECTION for additional handling information and protection of employees.

14. Transport information

**Regulatory information**

<table>
<thead>
<tr>
<th>Regulatory information</th>
<th>UN Number</th>
<th>Proper shipping name</th>
<th>Classes</th>
<th>PG*</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT Classification</td>
<td>Not regulated</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>IATA-DGR class</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
<td>-</td>
</tr>
</tbody>
</table>

**PG**: Packing group

15. Regulatory information

**United States**

**HCS Classification:** Irritating material

**Target organ effects**

**U.S. Federal regulations:**

**SARA 302/304/311/312 extremely hazardous substances:** No products were found.

**SARA 302/304 emergency planning and notification:** No products were found.

**SARA 302/304/311/312 hazardous chemicals:** Ethanediol.

**Clean Water Act (CWA) 307:** No products were found

**Clean Water Act (CWA) 311:** No products were found

**Clean Air Act (CAA) 112 accidental release prevention:** No products were found

**Clean Air Act (CAA) 112 : regulated flammable substances**

**Clean Air Act (CAA) 112 : regulated toxic substances**

**SARA 313**

**Form R-Reporting requirements:**

<table>
<thead>
<tr>
<th>Product name</th>
<th>CAS number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanediol</td>
<td>107-21-1</td>
<td>1-3</td>
</tr>
<tr>
<td>Ethanediol</td>
<td>107-21-1</td>
<td>1-3</td>
</tr>
</tbody>
</table>

**SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.**

**Canada**

**WHMIS (Canada):**

Class D-2A: Material causing other toxic effects (very toxic)

Class D-2B: Material causing other toxic effects (Toxic)
15. Regulatory information

Canadian lists:
- CEPA Toxic substances: None of the components are listed.
- Canadian ARET: None of the components are listed.
- Canadian NPRI: The following components are listed: Ethylene glycol.
- Alberta Designated Substances: None of the components are listed.
- Ontario Designated Substances: None of the components are listed.
- Quebec Designated substances: None of the components are listed.

Canadian inventory: Not determined

Risk phrases: This product is not classified according to EU legislation.

International regulations

International lists:
- Australia inventory (AICS): Not determined.
- China inventory (IECSC): Not determined
- Korea inventory (KECI): Not determined
- Philippines inventory (PICCS): Not determined
- Japan inventory (ENCS): Not determined

16. Other information

Label requirements:

Hazardous Material information System (U.S.A.):

- Health: 2
- Flammability: 0
- Physical hazards: 0

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.):

- Health: 2
- Flammability: 0
- Instability: 0
- Special: 0

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contain herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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