1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Dissolvine® GL-47-S

Chemical Name: Tetrasodium N,N-bis(carboxymethyl)-L-glutamate

Synonym(s): L-Glutamic acid, N,N-diaceitic acid tetrasodium salt (GLDA-Na4)

Product Use: Chelating agent

Manufacturer / Supplier: Akzo Nobel Functional Chemicals LLC

525 West Van Buren St., Chicago, IL, USA 60607

Tel. (800) 906-7979

www.dissolvinegl.com

Emergency Telephone Numbers

CHEMICAL EMERGENCY
(Spill, Leak, Fire, Exposure or Accident)

CHEMTREC (800) 424-9300 (Toll-free in the U.S., Canada, and the U.S. Virgin Islands)

(24-hr) (703) 527-3887 (For calls originating elsewhere / collect calls are accepted)

CANUTEC (Canada) (613) 996-6666

MEDICAL / HANDLING EMERGENCIES

(914) 693-6946 [AkzoNobel – USA]

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

This material is considered hazardous by the OSHA Hazard Communication Standard [29 CFR 1910.1200]

WARNING !

- May cause eye and respiratory tract irritation.
- Corrosive to metal.

Appearance and odor: Pale yellow liquid with a slight ammonia odor.

POTENTIAL HEALTH EFFECTS [See Section 11 for additional information]

Primary Route(s) of Exposure: Eye contact, skin contact and inhalation

Acute Exposure

Inhalation: Exposure to an excessive concentration of vapors, mist, fumes or aerosols may cause respiratory tract discomfort and/or mild irritation.

Skin Contact: Skin contact is not expected to cause irritation.

Eye Contact: Eye contact may cause mild irritation.

Ingestion: This product is expected to have a low order of acute toxicity.

Carcinogenicity: IARC, NTP, ACS, and OSHA do not classify this material as a carcinogen or suspect carcinogen.

Medical conditions aggravated by exposure: There are no data available that address medical conditions that are generally recognized as being aggravated by exposure to this product.

POTENTIAL ENVIRONMENTAL EFFECTS [See Section 12 for additional information]

Aquatic Toxicity: This product is not expected to be harmful to aquatic life, based on available data.
3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>CAS Number</th>
<th>% (w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Glutamic acid, N,N-diacetic acid tetrasodium salt (GLDA-Na₄)</td>
<td>51981-21-5</td>
<td>47 - 49</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>1310-73-2</td>
<td>0.5 - 1.9</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Balance</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**Inhalation**
Remove victim to fresh air. If irritation occurs or if breathing becomes difficult, get medical attention.

**Skin Contact**
Remove contaminated clothing, shoes and equipment. Wash all affected areas with soap and plenty of water. Wash contaminated clothing and shoes before reuse. Get medical attention if irritation occurs or persists.

**Eye Contact**
Flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. Do not let victim rub eye(s). Do not attempt to neutralize with chemical agents. Get medical attention if eye irritation occurs.

**Ingestion**
Give several glasses of water. DO NOT induce vomiting. If vomiting occurs, keep head below hips to reduce risk of aspiration. Give fluids again. Never give anything by mouth to a person who is unconscious or convulsing. Get medical attention if health effects occur.

**Note to Physician**
Attending physician should treat exposed patients symptomatically.

5. FIRE FIGHTING MEASURES

**Flammable properties**
Not flammable or combustible

**Extinguishing Media**
Use water fog or spray, dry chemical, foam or carbon dioxide extinguishing agents.

**Fire Fighting Procedures**
As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate all non-essential personnel from the fire area. Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

**Fire & Explosion Hazards**
This product is not defined as flammable or combustible and should not be a fire hazard. Under fire conditions, it may produce irritating fumes and/or gases if heated to 600°C (1112°F) or above.

**Hazardous Combustion Products**
Thermal decomposition products may release toxic and/or hazardous fumes and gases, including nitrogen oxides, carbon oxides, ammonia and sodium hydroxide.

6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**
All personnel involved in spill cleanup should avoid skin and eye contact by wearing appropriate personal protective equipment (See Section 8).

**Methods for containment**
Safely stop source of spill. Dike area to prevent spill from spreading. Restrict non-essential personnel from area.

**Environmental precautions**
Collect as much as possible in a clean container for reuse (if not contaminated) or disposal (if contaminated).

**Methods for clean-up**
Soak up liquid residue with a suitable absorbent such as clay, sawdust or kitty litter. Sweep up absorbed material and place in a chemical waste container for disposal. Then flush area with water. CAUTION – The spill area may be slippery.

**Other information**
See also Section 13 for disposal information.
7. Handling and Storage

Handling
Avoid inhalation of vapors or fumes as well as prolonged and/or repeated skin and eye contact.

Storage
Keep containers closed and dry. This material is suitable for any general chemical storage area. Isolate from incompatible materials such as strong oxidizing agents. Store in PVC, PE, stainless steel or bituminized tanks. Avoid contact with aluminum, copper, copper alloys, nickel and zinc.

Recommended Storage Temperature
Store in a cool and dry place at ambient temperature (below 25°C / 77°F).

General Comments
Containers should not be opened until ready for use. Opened containers must be closed again properly. It is advised to re-test the product after three years of storage.

8. Exposure Controls / Personal Protection

Exposure Guidelines
Other than any exposure limits which may be displayed below, there are no other known exposure limits applicable to this product or its components.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>OSHA – PELs (mg / m³)</th>
<th>ACGIH – TLVs (mg / m³)</th>
<th>NIOSH – RELs (mg / m³)</th>
<th>AIHA – WEELs (mg / m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA STEL / CEIL(C)</td>
<td>TWA STEL / CEIL(C)</td>
<td>TWA STEL / CEIL(C)</td>
<td>TWA STEL / CEIL(C)</td>
</tr>
<tr>
<td>L-Glutamic acid, N,N-diacetic acid tetrasodium salt</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>2.0 N/D</td>
<td>N/D 2.0 (C)</td>
<td>N/D 2.0 (C)</td>
<td>N/D N/D</td>
</tr>
<tr>
<td>Water</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
<td>N/D N/D</td>
</tr>
</tbody>
</table>


Legend:

CEIL: Ceiling Exposure Limit
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
TLV: Threshold Limit Value
TWA: Time-Weighted Average
REL: Recommended Exposure Limit
WEEL: Workplace Environmental Exposure Level
N/D: Not Determined

ACGIH: American Conference of Governmental Industrial Hygienists
AIHA: American Industrial Hygiene Association
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety and Health Administration

IDLH
[Immediately Dangerous to Life or Health Concentrations (NIOSH)]

Sodium hydroxide = 10 mg/m³

Engineering Controls & Ventilation
Special ventilation is usually not required under normal use conditions. Ensure that existing ventilation is sufficient to prevent the circulation and/or accumulation of vapors in the air.

Personal Protective Equipment (PPE)

Respiratory
Use of respiratory protection is generally not required. However, if use conditions generate vapors, aerosols or fumes and adequate ventilation (e.g., outdoor or well-ventilated area) is not available, use a NIOSH-approved organic vapor respirator with HEPA (High Efficiency Particulate Air) filters to reduce potential for inhalation exposure. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure/predemand, air-supplied respirator. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

Skin
Skin contact with the product should be minimized or prevented through the use of suitable protective clothing, gloves and footwear selected according to use condition exposure potential. For permanent (>8 hours) full contact use, 100% Viton gloves are recommended.

Eyes/face
Since eye contact may cause irritation, chemical goggles and/or a face shield should be worn when handling this product.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION (CONTINUED)

Hygiene Measures

All food and smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking and smoking, hands and face should be thoroughly washed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form: liquid
Color: pale yellow
Odor: slight ammonia odor
Boiling Point: 221-230°F (105-110°C)
Bulk Density: not applicable
Evaporation Rate (Butyl Acetate=1): not determined
Melting Point: < 5°F / < -15°C [crystallization point]
Odor Threshold: not determined
pH: 11-12 (1% solution)
Partition Coefficient (n-octanol/water): Log P_{ocw} < 0
Solubility in water: miscible
Solubility in other solvents: not determined
Specific Gravity: 1.38 – 1.42
Vapor Density (Air = 1): same as water
Vapor Pressure: same as water
Viscosity: 100-200 mPa.s (68°F / 20°C)
Volatiles (% by weight): not determined
Other: not determined
Flammability: not flammable or combustible
Flash Point (Method): not applicable
Upper Flammable Limit (% by volume): not applicable
Lower Flammable Limit (% by volume): not applicable
Auto-Ignition Temperature: not applicable

10. STABILITY AND REACTIVITY

Chemical stability: This product is stable under recommended storage and handling conditions (see section 7). It is not self-reactive and is not sensitive to physical impact.

Conditions to avoid: Avoid contact with aluminum, nickel, zinc, copper and copper alloys.

Incompatible materials: This product is incompatible with strong oxidizers.

Hazardous decomposition products: Under fire conditions the product may support combustion and decomposes to give off carbon oxides fumes (CO, CO₂), nitrogen oxides and ammonia.

Possibility of hazardous reactions: Hazardous polymerization is not expected to occur under normal temperatures and pressures.
11. TOXICOLOGICAL INFORMATION

**Inhalation - Acute**
The acute LC50 for this product is not available.

**Inhalation - Chronic**
No known effects for the mixture.

**Skin - Acute**
Dermal toxicity for this product is not available. A similar product containing 71% L-Glutamic acid, \(N,N\)-diacetic acid tetrasodium (GLDA-Na4) was not irritating to rabbit skin after a 4-hour exposure to 0.5 ml (164 mg). The Primary Irritation Index was 0.0.

**Skin - Chronic**
No known effects for the mixture.

**Eyes**
A similar product containing 71% GLDA-Na4 was minimally irritating to rabbit eyes following the instillation of 0.1 ml (31 mg). The maximum irritation score was 3.3.

**Ingestion - Acute**
The oral LD50 is expected to be greater than 2,000 mg/kg (rat), based on tests with a similar product containing 71% GLDA-Na4.

**Ingestion - Chronic**
In a 90-day oral gavage study, GLDA induced reversible changes in some blood and urine parameters without concomitant microscopic changes in the kidneys or other organs. The NOAEL is 300 mg/kg/day.

**Sensitization**
A similar product containing 75% GLDA-Na4 was not sensitizing to guinea pig skin.

**Carcinogenicity**
IARC, NTP, ACGIH and OSHA do not classify this material as a carcinogen or suspect carcinogen.

**Mutagenicity**
A similar product containing 71% GLDA-Na4 was negative in the Ames, CHO HGPRT forward mutation and micronucleus tests. It was weakly clastogenic to CHL cells in vitro.

**Other Effects**
None known.

**Target Organs**
Eyes, kidney and bladder.

12. ECOLOGICAL INFORMATION

**Ecotoxicity**
Experiments on products containing 71-74% L-Glutamic acid, \(N,N\)-diacetic acid tetrasodium component (GLDA-Na4) yielded the following ecotoxicity data:

<table>
<thead>
<tr>
<th>Test</th>
<th>Exposure / Duration</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daphnia Magna</td>
<td>48-h</td>
<td>EC50 &gt; 100 mg/L</td>
</tr>
<tr>
<td>Algae</td>
<td>72-h</td>
<td>EC50 &gt; 100 mg/L</td>
</tr>
<tr>
<td>Rainbow Trout</td>
<td>96-h (oncorhynchus mykiss)</td>
<td>LC50 &gt; 100 mg/L</td>
</tr>
</tbody>
</table>

**Biodegradation**
GLDA-Na4 gave the following positive and negative results:
- Readily biodegradable [Closed Bottle Test and Test with inoculum from Maas & Rhine rivers]
- Inherently and ultimately biodegradable [Zahn-Wellens Test]
- Not readily biodegradable [Modified Sturm Test]
- Not biodegradable under anaerobic conditions

**Bioaccumulation**
GLDA-Na4 has a Log Pow < 3

**Other Ecotoxicity information**
GLDA-Na4 did not inhibit respiration in activated sludge.

13. DISPOSAL CONSIDERATIONS

**Waste Disposal**
In its unused condition, this product is not considered to be a RCRA-defined hazardous waste by characteristics or listings. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristic or listing. Dispose in accordance with all local, state and federal regulations. NOTE – State and local regulations may be more stringent than federal regulations.
13. DISPOSAL CONSIDERATIONS (CONTINUED)

**Container Disposal**
Containers should be cleaned of residual product before disposal or return. Since emptied containers retain product residue, follow label warnings even after container is emptied. Empty containers should be disposed of or shipped in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

<table>
<thead>
<tr>
<th>Regulatory Information</th>
<th>UN Number</th>
<th>Proper Shipping Name</th>
<th>Class</th>
<th>PG</th>
<th>Label</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US DOT (Land)</strong></td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>This product is <em>not regulated</em> as hazardous by DOT, per 49CFR §173.154 (d) exception for materials corrosive to metals (steel and/or aluminum).</td>
</tr>
<tr>
<td><strong>US DOT (Air)</strong></td>
<td>UN3267</td>
<td>Corrosive liquid, basic, organic, n.o.s.</td>
<td>8</td>
<td>III</td>
<td>Corrosive</td>
<td></td>
</tr>
<tr>
<td><strong>Canada TDG</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>IMDG</strong></td>
<td></td>
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<tr>
<td><strong>IATA / ICAO</strong></td>
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</tr>
</tbody>
</table>

**Emergency Response Guidebook (2008 ERG)**

**Environmentally Hazardous Substances**
[Sodium hydroxide: RQ = 1000 lbs (454 kg)]

15. REGULATORY INFORMATION

**Regulatory Lists / Inventories:** The components are subject to the following regulatory lists and inventories:

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAA</th>
<th>CERCLA</th>
<th>IARC</th>
<th>US STATE RIGHT-TO-KNOW LISTS</th>
<th>CA PROP 65</th>
<th>SARA</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Glutamic acid, N,N-diacetic acid tetrasodium</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>N/R</td>
<td>X</td>
<td>N/R</td>
<td><strong>CA / FL / IL / MA / MN / NJ / PA / RI</strong></td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>Water</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
<td>N/R</td>
</tr>
</tbody>
</table>

**National Chemical Inventories Status:**

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>US TSCA</th>
<th>Canada</th>
<th>EU EINECS</th>
<th>Australia AICS</th>
<th>New Zealand NZIoC</th>
<th>Japan ENCS</th>
<th>Korea KECI</th>
<th>Philippines PICCS</th>
<th>China IECSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-Glutamic acid, N,N-diacetic acid tetrasodium</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Water</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Legend**

- **AICS**
- **CA LIST**
- **CA PROP 65**
- **CAA**
- **CERCLA**
- **DSL**
- **Australia Inventory of Chemical Substances**
- **California – Directors List of Hazardous Substances**
- **California Proposition 65**
- **Clean Air Act, Section 112**
- **CERCLA Hazardous Substances**
- **Domestic Substances List – Canada**

Issue date: 8-Jul-09          MSDS No.: 16–075514
Revision N°: 1.0              Page 6 / 7
15. REGULATORY INFORMATION (CONTINUED)

CANADA – WHMIS (Workplace Hazardous Materials Information System)

Class E
Corrosive to metal
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.

Other Regulatory Information
None available.

16. OTHER INFORMATION

NFPA Rating
Health: 1 / Fire: 0 / Instability: 0 / Other: None
[0 – Minimal / 1 – Slight / 2 – Moderate / 3 – High / 4 – Extreme]

HMIS RATING
Health: 1 / Flammability: 0 / Physical Hazard: 0 / Other: None
[0 – Minimal / 1 – Slight / 2 – Moderate / 3 – High / 4 – Extreme / * – Chronic Health Hazard (see Section 11)]

Trademark
Dissolvine® is a registered trademark of Akzo Nobel Chemicals B.V.

Date of Issue / Revision
July 8, 2009

Revision No.
1.0

Changes
Section 15 [DSL Listing]

Prepared by
AkzoNobel [Technology & Engineering, Regulatory Toxicology]
Tel. 613.273.8095

Disclaimer
The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. Akzo Nobel Functional Chemicals LLC makes no warranty, express or implied as to the product’s merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer shall determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered. If the date of this document is more than three years old, please call to ensure that this sheet is current.

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