

# Safety Data Sheet



Revision Date: 7/25/2014

MSDS #: 10201

DAB Solution

## 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Description:**

**Product Code**

DAB Substrate Solution

71-00-08

DAB Solution

71-00-46

**Hazardous Reagent**

DAB Solution

**Hazardous Reagent Product code**

Catalog No. Listed Above

**Recommended Use** Reagent

**Contact Manufacturer** KPL, Inc.  
910 Clopper Road  
Gaithersburg, Maryland 20878  
USA

**Phone #:** 1-800-638-3167  
**Fax #:** 1-301-948-169  
**Web:** www.kpl.com  
**Email:** kplmsds@seracare.com

**Emergency Telephone Numbers:**

|  |                               |                                  |
|--|-------------------------------|----------------------------------|
| AUSTRALIA – POISONS INFORMATION CENTER | Telephone: 13 11 26           | Hours: 24 hours                  |
| CANADIAN TRANSPORT EMERGENCY CENTER    | Telephone: (1 ) 613 996 6666  | Hours: 24 hours/day, 7 days/week |
| UK – THE NATIONAL FOCUS                | Telephone: (44) 029 2041 6388 | Hours: 09:00-17:00 GMT           |
| USA- NATIONAL RESPONSE CENTER          | Telephone: (1 ) 800 424 8802  | Hours: 24 hours/day, 7 days/week |

**CHEMTREC:** CHEMTREC Customer Number:- CCN12505\*  
For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident  
Call CHEMTREC Day or Night  
Within USA and Canada: 1-800-424-9300 CCN12505 or  
+1 703-527-3887 (collect calls accepted)

## 2. HAZARD IDENTIFICATION

**Hazard Type**

Health Hazard

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

**Classification**

Carcinogenicity, Category 2; H351  
Germ cell mutagenicity (Category 2A); H341  
Acute toxicity, Category 4, oral; H302  
Skin irritation, Category 2; H315  
Eye irritation, Category 2; H319  
Specific Target Organ Toxicity (single exposure), Category 3; H335

**Hazard Statement**

H351: Suspected of causing cancer.  
H341: Suspected of causing genetic defects.  
H302: Harmful if swallowed.  
H315: Causes skin irritation.  
H319: Causes serious eye irritation.  
H335: May cause respiratory irritation.

**Precautionary Statement**

P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
P281: Use personal protective equipment as required.

**DAB Solution**

P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
 P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes.  
 Remove contact lenses, if present and easy to do. Continue rinsing.  
 P308+P313: IF exposed or concerned: Get medical advice/attention.  
 P264: Wash skin thoroughly after handling.

**Symbols of Danger**

GHS08  
 GHS07  
 Danger

**Data for 100% Hazardous Chemical**

**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by ingestion.

**INHALATION RISK:** A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

**SHORT-TERM EXPOSURE:** The substance may cause effects on the kidneys, resulting in kidney impairment. The substance may cause effects on the central nervous system and liver by ingestion. Exposure by ingestion may result in death.

**LONG-TERM EXPOSURE:** Not Available

**The product is a Mixture. It May Cause the following symptoms.**

**INGESTION:** Abdominal pain. Nausea. Vomiting. Diarrhoea. Dizziness. Drowsiness. Confusion. Unconsciousness.

Direct contact with product may result in eye irritation.

Absorption through skin may occur. May cause irritation to the skin

May cause irritation to the respiratory tract.

May be harmful if swallowed.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

| <u>Component</u> | <u>CHEMICAL</u>                       | <u>% Weight</u> | <u>CAS #:</u> |
|------------------|---------------------------------------|-----------------|---------------|
| DAB Solution     | Hydrochloric Acid                     | 3.3%            | 7647-01-0     |
|                  | 3,3'-Diaminobenzidine                 | 2.5%            | 7411-49-6     |
|                  | 2,2' -oxybisethanol diethylene glycol | 80%             | 111-46-6      |

**Classification**

Carcinogenicity, Category 2; H351  
 Germ cell mutagenicity (Category 2A); H341  
 Acute toxicity, Category 4, oral; H302  
 Skin irritation, Category 2; H315  
 Eye irritation, Category 2; H319  
 Specific Target Organ Toxicity (single exposure), Category 3; H335

### 4. FIRST AID MEASURES

**Data for 100% Hazardous Chemical**

**Ingestion First Aid:** Give one or two glasses of water to drink. Refer immediately for medical attention. See Notes. 007

**Inhalation First Aid:** Fresh air, rest.

**Skin First Aid:** Rinse skin with plenty of water or shower.

**Eye First Aid:** Rinse with plenty of water (remove contact lenses if easily possible).

### 5. FIRE FIGHTING MEASURES

**Data For 100% Hazardous Chemical**

|  |  |  |
|--|--|--|
| <b>Fire Acute Hazard:</b><br>Combustible.  | <b>Fire Prevention:</b><br>NO open flames. | <b>Fire Fighting:</b><br>Powder, alcohol-resistant foam, water spray, carbon dioxide . |
| <b>Explosion Acute Hazard:</b><br>Not Available  | Not Available                              | Not Available  |
| <b>CHEMICAL DANGERS:</b> Reacts violently with strong oxidants causing fire and explosion hazard. Attacks some forms of plastic. |  |  |
| <b>PHYSICAL DANGERS:</b> Not Available   |  |  |

## 6. ACCIDENTAL RELEASE MEASURES

|                                  |   |
|----------------------------------|---|
| <b>Personal Precautions</b>      | Wear a dust mask.<br>Carefully sweep up, gather and remove. Avoid rising dust.<br>Afterwards ventilate area and wash spill site.  |
| <b>Environmental Precautions</b> | Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Severe hazard to waters. Inform the responsible authorities when only small quantities get into water, drainage, sewer, or the ground. |
| <b>Method of Containment</b>     | Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.  |
| <b>Methods of Clean-up</b>       | Wash away spilled liquid with plenty of water.  |
| <b>Other Information</b>         | Data for 100% Diethylene Glycol: Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance.   |

### Data for 100% Hazardous Chemical

|                          |  |
|--------------------------|--|
| <b>SPILLAGE DISPOSAL</b> | Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking liquid in sealable containers. Wash away spilled liquid with plenty of water. |
|--------------------------|--|

## 7. HANDLING AND STORAGE

|                  |   |
|------------------|---|
| <b>Handling:</b> | Handle in accordance with good industrial hygiene and safety practice.  |
| <b>Storage:</b>  | Store at room temperature. Data for 100% Diethylene Glycol: Dry. Well closed. Separated from strong oxidants. |

### Data for 100% Hazardous Chemical

|                |   |
|----------------|---|
| <b>STORAGE</b> | Dry. Well closed. Separated from strong oxidants. |
|----------------|---|

## 8. EXPOSURE CONTROL

### Data for 100% Hazardous Chemical

|                    |  |
|--------------------|--|
| <b>•INHALATION</b> | Ventilation.                             |
| <b>•EYES</b>       | Safety spectacles.                       |
| <b>•SKIN</b>       | Protective gloves.                       |
| <b>•INGESTION</b>  | Do not eat, drink, or smoke during work. |

|                             |  |
|-----------------------------|--|
| <b>Engineering Controls</b> | Appropriate engineering controls<br>Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.<br>Personal protective equipment:<br>Eye/face protection -<br>Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).<br>Skin protection -<br>Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without |
|-----------------------------|--|

**DAB Solution**

touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance** Clear Light brown solution

**Physical State** Liquid **pH:** < 2.0

### Data for 100% Hazardous Chemical

|  |                         |  |   |   |   |
|--|-------------------------|--|---|---|---|
| Boiling point: 244 °C                  | Melting point: -6.5°C   | Relative density (water = 1): 1.12<br>Temperature: 20 °C | Solubility in water: miscible           | Vapour pressure, Pa at 20°C: 2.7                      | pH-VALUE: 6 - 8<br>Temperature: 20 °C<br>Concentration: 200 g/l |
| Relative vapour density (air = 1): 3.7 | Flash point: 124°C c.c. | Auto-ignition temperature: 229°C                         | Explosive limits, vol% in air: 1.6-10.8 | Octanol/water partition coefficient as log Pow: -1.47 |   |

## 10. STABILITY AND REACTIVITY

**Chemical Stability** Stable under normal conditions

**Incompatibility Materials to Avoid** Strong oxidants.

**Hazardous Decomposition Products** Upon evaporation of water, toxic gases and vapors may be released if involved in a fire.

**Hazardous Polymerization** Will not occur

### Data for 100% Hazardous Chemical

|                          |   |
|--------------------------|---|
| <b>CHEMICAL DANGERS:</b> | Reacts violently with strong oxidants causing fire and explosion hazard. Attacks some forms of plastic. |
| <b>PHYSICAL DANGERS:</b> | Not Available   |

## 11. TOXICOLOGY MEASURES

### Acute Toxicity

The toxicological risks are minor due to the low concentration of hazardous ingredients. The following toxicological information is for the hazardous ingredient in pure form.

**LD50 Oral** LD50 oral rat: 12600 mg/kg  
Reference: Raw Material Data Handbook, Vol.1: Organic Solvents, 1974. Vol. 1, Pg. 25, 1974.

**LD50 Dermal** LD50 dermal rat/rabbit: 11900 mg/kg  
Species: Rabbit  
Reference: Raw Material Data Handbook, Vol.1: Organic Solvents, 1974. Vol. 1, Pg. 25, 1974.

**LC50 Inhalation** LC50 Fish (96 hours)  
Minimum: 75200 mg/l  
Maximum: 75200 mg/l  
Median: 75200 mg/l  
Study number: 1  
Reference: Geiger, D.L., L.T. Brooke, and D.J. Call 1990. Acute Toxicities of Organic Chemicals to Fathead Minnows (*Pimephales promelas*), Volume 5. Ctr.for Lake Superior Environ.Stud., Univ.of Wisconsin-Superior, Superior, WI :332 p.

### Chronic Toxicity

**Carcinogenicity** Data for 100% 3,3'-Diaminobenzidine: May Cause Cancer

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|                              |  |
|------------------------------|--|
| <b>Irritation</b>            | Data for 100% Diethylene Glycol: Eyes - rabbit   Result: No eye irritation                                   |
| <b>Corrosivity</b>           | Data for 100% Diethylene Glycol: Skin - rabbit   Result: No skin irritation (OECD Test Guideline 404)        |
| <b>Sensitization</b>         | Data for 100% Diethylene Glycol: Maximisation Test - guinea pig   Result: Did not cause sensitisation on lab |
| <b>Neurological Effects</b>  | Not Available  |
| <b>Mutagenic Effects</b>     | Data for 100% 3,3'-Diaminobenzidine: Suspected of causing genetic defects.                                   |
| <b>Reproductive Effects</b>  | Not Available  |
| <b>Developmental Effects</b> | Not Available  |
| <b>Target Organ Effects</b>  | Data for 100% Diethylene Glycol: Kidneys, Central Nervous System and Liver                                   |
| <b>Other adverse effects</b> | Not Available  |

## 12. ECOLOGICAL MEASURES

|  |  |
|--|--|
| <b>Ecotoxicity</b>                     | Data for 100% 2,2' -oxybisethanol diethylene glycol : Aquatic Toxicity: > 32,000 ppm/96 hr/mosquito fish/TLm/ fresh water<br>Waterfowl Toxicity: Currently not available<br>Biological Oxygen Demand (BOD): 6%, 5 days   |
| <b>Persistence/Degradability</b>       | Data for 100% 2,2' -oxybisethanol diethylene glycol : Readily Biodegradable  |
| <b>Mobility in Environmental Media</b> | Data for 100% 2,2' -oxybisethanol diethylene glycol : Using a structure estimation method based on molecular connectivity indices(1), the Koc of diethylene glycol can be estimated to be 1(SRC). According to a classification scheme(2), this estimated Koc value suggests that diethylene glycol is expected to have very high mobility in soil. [(1) Meylan WM et al; Environ Sci Technol 26: 1560-67 (1992) (2) Swann RL et al; Res Rev 85: 17-28 (1983)] **PEER REVIEWED**   |
| <b>Bioaccumulation/ Accumulation</b>   | Data for 100% 2,2' -oxybisethanol diethylene glycol : An estimated BCF of 3 was calculated in fish for diethylene glycol(SRC), using an estimated log Kow of -1.5(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC). [(1) Meylan WM, Howard PH; J Pharm Sci 84: 83-92 (1995) (2) Meylan WM et al; Environ Toxicol Chem 18: 664-72 (1999) (3) Franke C et al; Chemosphere 29: 1501-14 (1994)] **PEER REVIEWED** |

## 13. DISPOSAL MEASURES

|                                |   |
|--------------------------------|---|
| <b>Waste Disposal Method:</b>  | Observe all Federal, State and Local laws concerning health and pollution. Data for 100% 2,2' -oxybisethanol diethylene glycol : Collection of small amounts of substance: Place in a collection container for halogen-free organic solvents and solutions of halogen-free organic substances. Collection vessels must be clearly labelled with a systematic description of their contents and with the hazard symbol and the R and S phrases. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal. |
| <b>Contaminated Packaging:</b> | Avoid contact with skin and clothing. Place contaminated packaging in a break proof outer vessel and dispose on in compliance with national and local regulations.  |
| <b>US EPA Waste Number:</b>    | EPA AEGL: Not listed  |

## 14. TRANSPORTATION MEASURES

|                                      |  |
|--------------------------------------|--|
| <b>DOT:</b>                          | Hydrochloric acid Hazard Class/Division: 8<br>Identification Number: UN1789  |
| <b>IATA:</b>                         | Not Available  |
| <b>ADR (road)/ RID (rail):</b>       | Not Available  |
| <b>IMDG (sea):</b>                   | Not Available  |
| <b>General Transport Regulations</b> | Data for 100% 2,2' -oxybisethanol diethylene glycol : Grades of Purity: Regular grade; polyester grade<br>7.2 Storage Temperature: Ambient |

Inert Atmosphere: No requirement  
 Venting: Open (flame arrester)  
 IMO Pollution Category: D  
 Ship Type: Data not available  
 Barge Hull Type: Currently not available

## 15. REGULATORY MEASURES

**This product is a mixture that may contain one or more hazardous chemicals. The hazardous ingredients listed are only those as required by 29 CFR 1910.1200 (OSHA HCS).**

### **SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains no chemical or chemicals which are subject to the reporting requirements of the Act and Title 40n of the Code of Federal Regulations, Part 372.

### **Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (See 40 CFR 61)**

This product contains the following chemical or chemicals which are subject to the reporting requirements of the Clean Air Act, Section 112 HAPS: Hydrochloric Acid CAS 7647-01-0

### **State Regulations**

#### **California Proposition 65:**

This product contains the following Proposition 65 chemicals: None Listed

### **State Right to Know Act**

| Chemical Name | Hydrochloric Acid | 3,3'-Diaminobenzidine | 2,2' - oxybisethanol diethylene glycol |
|---------------|-------------------|-----------------------|--|
| Massachusetts | Not Listed        | Listed                | Not Listed                             |
| New Jersey    | Not Listed        | Listed                | Not Listed                             |
| Pennsylvania  | Listed            | Listed                | Not Listed                             |
| New York      | Not Listed        | Listed                | Not Listed                             |
| Rhode Island  | Listed            | Listed                | Not Listed                             |

### **International Inventories**

| Chemical Name | Hydrochloric Acid | 3,3'-Diaminobenzidine | 2,2' - oxybisethanol diethylene glycol |
|---------------|-------------------|-----------------------|--|
| TSCA          | Listed            | Listed                | Listed                                 |
| DSL           | Listed            | Listed                | Listed                                 |
| NDSL          | Not Listed        | Not Listed            | Not Listed                             |
| EINECS        | Listed            | Listed                | Listed                                 |
| CHINA         | Listed            | Listed                | Listed                                 |
| KECL          | Listed            | Listed                | Not Listed                             |
| JAPAN:        | Listed            | Listed                | Listed                                 |
| AICS          | Listed            | Listed                | Listed                                 |

### **EU Regulations**

|                       |  |
|-----------------------|--|
| <b>Annex I Index#</b> | This product is a mixture. Classification is based on 2,2'-oxydiethanol: Annex 1 Index# 603-140-00-6, 100% and 3,3'-Diaminobenzidine (Diaminobenzidine Salt).  |
| <b>Classification</b> | Carcinogenicity, Category 2; H351<br>Germ cell mutagenicity (Category 2A); H341<br>Acute toxicity, Category 4, oral; H302<br>Skin irritation, Category 2; H315<br>Eye irritation, Category 2; H319<br>Specific Target Organ Toxicity (single exposure), Category 3; H335 |
| <b>Risk Phrases</b>   | H351: Suspected of causing cancer.<br>H341: Suspected of causing genetic defects.<br>H302: Harmful if swallowed.   |

**DAB Solution**

H315: Causes skin irritation.  
H319: Causes serious eye irritation.  
H335: May cause respiratory irritation.

**Safety Phrases**

P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
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P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes.  
Remove contact lenses, if present and easy to do. Continue rinsing.  
P308+P313: IF exposed or concerned: Get medical advice/attention.  
P264: Wash skin thoroughly after handling.

**Symbols and Indications of Danger**

GHS08  
GHS07  
Danger

**Specific Concentration Limits**

2,2'-oxybisethanol diethylene glycol CAS 111-46-6: Not Available  
Data for Hydrochloric Acid CAS 7647-01-0:  
Skin Corr. 1B; H314:  $C \geq 25\%$   
Skin Irrit. 2; H315:  $10\% \leq C < 25\%$   
Eye Irrit. 2; H319:  $10\% \leq C < 25\%$   
STOT SE 3; H335:  $C \geq 10\%$   
3,3'-Diaminobenzidine CAS 7411-49-6: Not Available

**Export and Import**

This substance is not listed in the Annex I of Regulation (EC) No 689/2008.

**European Priority List**

This substance is not listed in a priority list (as foreseen under Council Regulation (EEC) No 793/93 on the evaluation and control of the risks of existing substances.).

**16. OTHER INFORMATION**

The above information is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. KPL shall not be held liable for any damage resulting from handling or from contact with the above product. Users should make their own investigations to determine the suitability of the information for their particular purposes. This material is sold for research purposes and is intended as laboratory reagents only. It is not intended for food, drug, household, agricultural or cosmetic use. Its use must be supervised by a technically qualified individual experienced in handling potentially hazardous chemicals.

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