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.

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

Component	CHEMICAL	% Weight	CAS #:
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

Fire Acute Hazard:	Fire Prevention:	Fire Fighting:
Combustible.	NO open flames.	Powder, alcohol-resistant foam, water spray, carbon dioxide .

Explosion Acute Hazard:		
Not Available	Not Available	Not Available

CHEMICAL DANGERS: Reacts violently with strong oxidants causing fire and explosion hazard. Attacks some forms of plastic.

PHYSICAL DANGERS: Not Available

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Wear a dust mask. Carefully sweep up, gather and remove. Avoid rising dust. Afterwards ventilate area and wash spill site.
Environmental Precautions	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.
Method of Containment	Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.
Methods of Clean-up	Wash away spilled liquid with plenty of water.
Other Information	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

SPILLAGE DISPOSAL	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

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

Data for 100% Hazardous Chemical

STORAGE	Dry. Well closed. Separated from strong oxidants.

8. EXPOSURE CONTROL

Data for 100% Hazardous Chemical

•INHALATION	Ventilation.
•EYES	Safety spectacles.
•SKIN	Protective gloves.
•INGESTION	Do not eat, drink, or smoke during work.

Engineering Controls Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
Personal protective equipment:
Eye/face protection -
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).
Skin protection -
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without

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 Temperature: 20 °C	Solubility in water: miscible	Vapour pressure, Pa at 20°C: 2.7	pH-VALUE: 6 - 8 Temperature: 20 °C 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

CHEMICAL DANGERS:	Reacts violently with strong oxidants causing fire and explosion hazard. Attacks some forms of plastic.
PHYSICAL DANGERS:	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

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

12. ECOLOGICAL MEASURES

Ecotoxicity	Data for 100% 2,2' -oxybisethanol diethylene glycol : Aquatic Toxicity: > 32,000 ppm/96 hr/mosquito fish/TLm/ fresh water Waterfowl Toxicity: Currently not available Biological Oxygen Demand (BOD): 6%, 5 days
Persistence/Degradability	Data for 100% 2,2' -oxybisethanol diethylene glycol : Readily Biodegradable
Mobility in Environmental Media	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**
Bioaccumulation/ Accumulation	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

Waste Disposal Method:	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.
Contaminated Packaging:	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.
US EPA Waste Number:	EPA AEGL: Not listed

14. TRANSPORTATION MEASURES

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

Inert Atmosphere: No requirement
Venting: Open (flame arrester)
IMO Pollution Category: D
Ship Type: Data not avaialable
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 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

Annex I Index#	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).
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
Risk Phrases	H351: Suspected of causing cancer. H341: Suspected of causing genetic defects. H302: Harmful if swallowed.

H315: Causes skin irritation.
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H335: May cause respiratory irritation.

Safety Phrases

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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 ≥ 25 %
Skin Irrit. 2; H315: 10 % ≤ C < 25 %
Eye Irrit. 2; H319: 10 % ≤ C < 25 %
STOT SE 3; H335: C ≥ 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.

Revision Date: 7/25/2014