

Material Safety Data Sheet

Diethanolamine Substrate Buffer

1. Product and company identification

Product name	: Diethanolamine Substrate Buffer		
Synonym	: Diethanolamine Substrate Buffer (5X) Concentrate		
Supplier	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723	Manufacturer	: Thermo Fisher Scientific Pierce Biotechnology P.O. Box 117 Rockford, IL 61105 United States 815.968.0747 or 800.874.3723
Code	: 0034064		
MSDS #	: 0931		
Validation date	: 7/26/2012.		
Print date	: 7/26/2012.		
Responsible name	: MSDS Specialist		
In case of emergency	: CHEMTREC: 800.424.9300 OUTSIDE US: 703.527.3887	Material uses	: Refer to the instruction booklet for proper and intended use. Otherwise, contact supplier for specific applications.
Product type	: Liquid.		

2. Hazards identification

Emergency overview

Physical state	: Liquid. [Clear viscous liquid.]
Color	: Colorless.
Odor	: Ammoniacal. [Slight]
Signal word	: WARNING!
Hazard statements	: CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
Precautionary measures	: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Use personal protective equipment as required. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

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2. Hazards identification

Inhalation	: Severely irritating to the 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	: Severely irritating to eyes. Risk of serious damage to eyes.
Potential chronic health effects	
Chronic effects	: Contains material that can cause target organ damage.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
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 may cause damage to the following organs: blood, kidneys, liver, mucous membranes, heart, upper respiratory tract, immune system, skin, eyes, central nervous system (CNS).
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 aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
2,2'-iminodiethanol	111-42-2	45 - 65

Canada

Name	CAS number	%
2,2'-iminodiethanol	111-42-2	45 - 65

There are no 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.

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4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : 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.

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 thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
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 vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see 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).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

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6. Accidental release measures

- 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.

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. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. 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 between the following temperatures: 2 to 8°C (35.6 to 46.4°F). 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 unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
2,2'-iminodiethanol	ACGIH TLV (United States, 1/2011). Absorbed through skin. TWA: 1 mg/m ³ 8 hour(s). Form: Inhalable fraction and vapor ACGIH (United States). TWA: 2 mg/m ³ NIOSH (United States). TWA: 3 ppm NIOSH REL (United States, 6/2009). TWA: 15 mg/m ³ 10 hour(s). TWA: 3 ppm 10 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 15 mg/m ³ 8 hour(s). TWA: 3 ppm 8 hour(s).

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	Notations
2,2'-iminodiethanol	US ACGIH 1/2011	-	1	-	-	-	-	-	-	-	[1] [a]
	AB 4/2009	-	2	-	-	-	-	-	-	-	[1]
	BC 9/2011	-	2	-	-	-	-	-	-	-	[1]
	ON 7/2010	-	1	-	-	-	-	-	-	-	[1] [a]
	QC 9/2011	3	13	-	-	-	-	-	-	-	[1]

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8. Exposure controls/personal protection

[1]Absorbed through skin.

Form: [a]Inhalable fraction and vapor

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, vapor 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.

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 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 controls : 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 viscous liquid.]

Flash point : [Product does not sustain combustion.]

Color : Colorless.

Odor : Ammoniacal. [Slight]

pH : 9.6 to 10

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

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10. Stability and reactivity

Chemical stability : The product is stable.

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 : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

United States

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2,2'-iminodiethanol	LD50 Oral	Rat	710 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
2,2'-iminodiethanol	Eyes - Severe irritant	Rabbit	-	24 hours 750 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	5500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	50 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
2,2'-iminodiethanol	Positive - Dermal - TDLo	Mouse	21 g/kg	2 years Intermittent
	Positive - Dermal - TDLo	Mouse	57680 mg/kg	103 weeks Intermittent
	Positive - Dermal - TDLo	Mouse	28840 mg/kg	103 weeks Intermittent
	Positive - Dermal - TDLo	Mouse	20857 mg/kg	2 years Intermittent

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
2,2'-iminodiethanol	A3	3	-	None.	Proven.	-

Mutagenicity

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11. Toxicological information

Product/ingredient name	Test	Experiment	Result
2,2'-iminodiethanol	Unscheduled DNA Synthesis (UDS)	Subject: Mammalian-Animal Cell: Somatic	Positive

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
2,2'-iminodiethanol	-	-	-	Rat	Inhalation: 200 mg/m ³	6 hours 6-15 Days Pregnant
	-	-	Positive	Rat	Dermal: 15000 mg/kg	6-15 Days Pregnant
	-	-	-	Rat - Male	Oral: 18382 mg/kg	14 days
	-	Positive	-	Rat - Female	Oral: 2800 mg/kg	6-19 Days Pregnant
	-	-	-	Rat - Female	Oral: 1750 mg/kg	6-19 Days Pregnant
	-	-	-	Rat	Dermal: 15 g/kg	6-15 Days Pregnant
	-	-	-	Rabbit	Dermal: 4550 mg/kg	6-18 Days Pregnant

Conclusion/Summary : Not available.

Canada

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2,2'-iminodiethanol	LD50 Oral	Rat	710 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
2,2'-iminodiethanol	Eyes - Severe irritant	Rabbit	-	24 hours 750 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	5500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	50 milligrams	-

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

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11. Toxicological information

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
2,2'-iminodiethanol	Positive - Dermal - TDLo	Mouse	21 g/kg	2 years Intermittent
	Positive - Dermal - TDLo	Mouse	57680 mg/kg	103 weeks Intermittent
	Positive - Dermal - TDLo	Mouse	28840 mg/kg	103 weeks Intermittent
	Positive - Dermal - TDLo	Mouse	20857 mg/kg	2 years Intermittent

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
2,2'-iminodiethanol	A3	3	-	None.	Proven.	-

Mutagenicity

Product/ingredient name	Test	Experiment	Result
2,2'-iminodiethanol	Unscheduled DNA Synthesis (UDS)	Subject: Mammalian-Animal Cell: Somatic	Positive

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
2,2'-iminodiethanol	-	-	-	Rat	Inhalation: 200 mg/m ³	6 hours 6-15 Days Pregnant
	-	-	-	Rat - Male	Oral: 18382 mg/kg	14 days
	-	-	-	Rat - Female	Oral: 1750 mg/kg	6-19 Days Pregnant
	-	-	-	Rat	Dermal: 15 g/kg	6-15 Days Pregnant
	-	Positive	-	Rat - Female	Oral: 2800 mg/kg	6-19 Days Pregnant
	-	-	Positive	Rat	Dermal: 15000 mg/kg	6-15 Days Pregnant
-	-	-	Rabbit	Dermal: 4550 mg/kg	6-18 Days Pregnant	

Conclusion/Summary : Not available.

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12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

United States

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
2,2'-iminodiethanol	Acute EC50 7.8 mg/L Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute EC50 12 mg/L Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute LC50 28800 to 34600 ug/L Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute LC50 2150 ug/L Fresh water	Daphnia - Daphnia pulex	48 hours
	Acute LC50 100000 ug/L Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 0.2 to 0.5 g	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

Conclusion/Summary : Not available.

Canada

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
2,2'-iminodiethanol	Acute EC50 7.8 mg/L Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute EC50 12 mg/L Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute LC50 28800 to 34600 ug/L Fresh water	Crustaceans - Ceriodaphnia dubia - Neonate	48 hours
	Acute LC50 2150 ug/L Fresh water	Daphnia - Daphnia pulex	48 hours
	Acute LC50 100000 ug/L Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 0.2 to 0.5 g	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

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. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal 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. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

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13. Disposal considerations

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*
DOT Classification	Not regulated.	-	-	-
IATA-DGR Class	Not regulated.	-	-	-

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Irritating material
Carcinogen
Target organ effects

U.S. Federal regulations : TSCA 8(a) IUR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.

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: 2,2'-iminodiethanol
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: 2,2'-iminodiethanol: Immediate (acute) health hazard

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	2,2'-iminodiethanol	111-42-2	45 - 65
Supplier notification	2,2'-iminodiethanol	111-42-2	45 - 65

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.

State regulations

Massachusetts : The following components are listed: DIETHANOLAMINE

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15. Regulatory information

- New York** : The following components are listed: Diethanolamine
- New Jersey** : The following components are listed: DIETHANOLAMINE; ETHANOL, 2,2'-IMINOBI-
- Pennsylvania** : The following components are listed: ETHANOL, 2,2'-IMINOBI-
- United States inventory (TSCA 8b)** : All components are listed or exempted.
- Canada**
- WHMIS (Canada)** : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
- Canadian lists**
- Canadian NPRI** : The following components are listed: Diethanolamine
- CEPA Toxic substances** : None of the components are listed.
- Canada inventory** : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

- International lists** :
- Australia inventory (AICS)**: All components are listed or exempted.
 - China inventory (IECSC)**: All components are listed or exempted.
 - Japan inventory**: All components are listed or exempted.
 - Korea inventory**: All components are listed or exempted.
 - New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
 - Philippines inventory (PICCS)**: All components are listed or exempted.

16. Other information

- Label requirements** : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

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.) :



- Date of printing** : 7/26/2012.
- Date of issue** : 7/26/2012.
- Date of previous issue** : No previous validation.
- Version** : 1
- Prepared by** : MSDS Specialist

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16. Other information

- Indicates information that has changed from previously issued version.

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 contained 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.

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