

SAFETY DATA SHEET

Version: 1.0
Date of Issue: 09 May 2018
Date of First Issue: 09 May 2018

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In accordance with Schedule 1 of Hazardous Products Regulations (HPR) (WHMIS 2015)

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name M-Bond Curing Agent – Type 10
Other Means of Identification None

Recommended use and restrictions

Recommended use Adhesives.
Restrictions on use For professional users only. Anything other than the above.

Initial Supplier Identifier

Company Identification VISHAY MEASUREMENTS GROUP, INC.
Telephone Post Office Box 27777
Raleigh, NC 27611
USA
E-Mail (competent person) mm.us@vishaypg.com

Emergency telephone number

Emergency Phone No. 1-800-424-9300 CHEMTREC (24 hours)
Languages spoken English

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

In accordance with Schedule 1 of Hazardous Products Regulations (HPR) (WHMIS 2015)

Acute toxicity (Dermal) - Category 4
Skin corrosion/irritation - Category 1B
Skin sensitization - Category 1
Eye damage, category 1
Specific target organ toxicity — repeated exposure, Category 1
Reproductive toxicity - Category 1B
Reproductive toxicity - Effects on or via lactation
Aquatic toxicity, Chronic - Category 3

Label elements

Hazard Pictogram(s)



Signal Word(s)

DANGER

Hazard Statement(s)

Harmful in contact with skin.
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
Causes damage to organs through prolonged or repeated exposure.
May damage the unborn child. Suspected of damaging fertility.
May cause harm to breast-fed children.

Precautionary Statement(s)

Obtain special instructions before use.
Wear protective gloves/protective clothing/eye protection/face protection.
Do not breathe fumes/vapour.
Do not eat, drink or smoke when using this product.
Wash contaminated clothing before reuse.
Avoid contact during pregnancy and while nursing.
IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
IF ON SKIN: Wash with plenty of water.

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Immediately call a POISON CENTER/doctor.

IF exposed or concerned: Get medical advice/attention.

Dispose of contents in accordance with local, state or national legislation.

Other hazards

None known

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances Not applicable

Mixtures

GHS Classification

Chemical Name	CAS No.	Concentration (%W/W)	Common name(s), synonym(s) of the substance	Hazard classification
Triethylenetetramine	112-24-3	80 - 100	Trientine	Acute toxicity (Dermal) - Category 4 Skin corrosion/irritation - Category 1B Skin sensitization - Category 1 Aquatic toxicity, Chronic - Category 3
2-(2-Aminoethylamino)ethanol	111-41-1	1 - 5	Ethanol, 2-[(2-aminoethyl)amino]-	Skin corrosion/irritation - Category 1B Skin sensitization - Category 1 Specific target organ toxicity — single exposure - Category 3 (Respiratory tract) Reproductive toxicity - Category 1B Reproductive toxicity - Effects on or via lactation
2-Piperazin-1-ylethylamine	140-31-8	0.5 – 1.5	1-(2-Aminoethyl)piperazine	Acute toxicity (Oral) - Category 4 Acute toxicity (Dermal) - Category 3 Skin corrosion/irritation - Category 1B Skin sensitization - Category 1 Eye damage, category 1 Specific target organ toxicity — repeated exposure - Category 1 Reproductive toxicity - Category 1B Aquatic toxicity, Chronic - Category 3
3,6,9-Triazaundecamethylenediamine	112-57-2	0.5 – 1.5	Tetraethylenepentamine; 1,4,7,10,13-Pentaazatridecane	Acute toxicity (Oral) - Category 4 Acute toxicity (Dermal) - Category 4 Skin corrosion/irritation - Category 1B Skin sensitization - Category 1 Aquatic toxicity, Chronic - Category 2
2,2'-Iminodiethylamine	111-40-0	0.5 – 1.5	Diethylenetriamine; Bis(2-aminoethyl)amine	Acute toxicity (Oral) - Category 4 Acute toxicity (Dermal) - Category 4 Acute toxicity (Inhalation) - Category 1 Skin corrosion/irritation - Category 1B Skin sensitization - Category 1 Eye damage, category 1 Specific target organ toxicity — single exposure - Category 3 (Respiratory tract)

Prescribed Concentration Ranges used for trade secret purposes (Canada Gazette, Part II, Vol. 152, No. 8)

SECTION 4: FIRST AID MEASURES



Description of first aid measures

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Self-protection of the first aider	Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Ensure adequate ventilation. Do not breathe vapour. Avoid all contact. Contaminated clothing should be laundered before reuse. Avoid contact during pregnancy/while nursing.
Inhalation	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
Skin Contact	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Continue irrigation until medical attention can be obtained. Immediately call a POISON CENTER/doctor.
Eye Contact	IF IN EYES: Flush eyes with water for at least 15 minutes while holding eyelids open. Immediately call a POISON CENTER/doctor. Continue irrigation until medical attention can be obtained. Treatment by an ophthalmologist due to possible caustic burn of the eyes may be required.
Ingestion	IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. Continue irrigation until medical attention can be obtained. Do NOT induce vomiting.
Most important symptoms and effects, both acute and delayed	Harmful in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Causes damage to organs through prolonged or repeated exposure. May damage the unborn child. Suspected of damaging fertility. May cause harm to breast-fed children.
Indication of any immediate medical attention and special treatment needed	Treat symptomatically. IF IN EYES: Obtain prompt consultation, preferably from an ophthalmologist. Chemical eye burns may require extended irrigation.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing media Suitable Extinguishing Media Unsuitable extinguishing Media Special hazards arising from the substance or mixture	Extinguish with carbon dioxide, dry chemical, foam or waterspray. Do not use water jet. Direct water jet may spread the fire. Not flammable. Reacts with metals liberating hydrogen. Reaction products may include hydrogen cyanide. May decompose in a fire giving off toxic fumes. Carbon monoxide, Carbon dioxide. May react with some metals including aluminum, magnesium, and zinc, resulting in evolution of phosphorus oxides.
Special protective equipment and precautions for fire fighters	Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	Use personal protective equipment as required. Wear appropriate personal protective equipment, avoid direct contact. Contaminated clothing should be laundered before reuse. Ensure adequate ventilation. Avoid breathing vapours. Avoid all contact. Avoid contact during pregnancy/while nursing.
Environmental precautions	Avoid release to the environment. Do not release undiluted and unneutralised to the sewer. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body.
Methods and material for containment and cleaning up	Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a container for disposal. Cautiously neutralize remainder. Then wash away with plenty of water. Ventilate the area and wash spill site after material pick-up is complete. Dispose of this material and its container as hazardous waste
Reference to other sections	See Section: 8, 13

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Ensure operatives are trained to minimise exposures. Avoid all contact. Do not breathe vapour. Avoid contact during pregnancy/while nursing. Ensure adequate ventilation. Use personal protective
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<p>Conditions for safe storage, including any incompatibilities Storage temperature Incompatible materials</p> <p>Specific end use(s)</p>	<p>equipment as required. See Section: 8. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Keep away from heat, sources of ignition and direct sunlight. Ambient: 5 - 25°C Copper, Aluminium, or Brass. Keep away from: Oxidizing agents and Acids. May be corrosive to metals. (Aluminium, Copper and Zinc). See Section: 1.2</p>
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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Occupational Exposure Limits Not established.

Alberta: Occupational Health And Safety Code, 2009; Quebec: Health and Safety Work Act, 2016

SUBSTANCE	CAS No.	8-hour Occupational Exposure Limits			15-minute or ceiling (c) Occupational Exposure Limits		Note
		ppm	mg/m ³	f/cc	STEL (ppm)	STEL (mg/m ³)	
2,2'-Iminodiethylamine	111-40-0	1*	4.2*	-	-	-	Alberta, Sk
		1	4.2	-	-	-	OEL

Source: Alberta: Occupational Health And Safety Code, 2009

OEL: Quebec Work Health and Safety Regulations, Health and Safety Work Act, (Chapter S – 2.1, a. 223)

Sk: The substance can be readily absorbed through intact skin.

* Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required

British Columbia: Occupational Health and Safety Guidelines, 2015; Northwest Territories: Occupational Health and Safety Regulations, 2012

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m ³)	STEL (ppm)	STEL (mg/m ³)	Note
2,2'-Iminodiethylamine [^]	111-40-0	1	-	-	-	WEL, Sk
		1	4.2	-	-	NW, Sk

Source: WEL: Occupational Health and Safety Guidelines Part 5: Chemical Agents and Biological Agents (British Columbia)

NW: WSCC, Occupational Health and Safety Regulations, Northwest Territories Volume 3

Sk: The substance can be readily absorbed through intact skin.

Ontario: Occupational Health and Safety Act, 1990; Saskatchewan: Occupational Health and Safety Regulations, 1996.

SUBSTANCE	CAS No.	Time Weighted Average (TWA)	STEL (ppm)	Note
Triethylenetetramine	112-24-3	3 mg/m ³	5	WEL, Sk
2,2'-Iminodiethylamine	111-40-0	1 ppm	2	SK, Sk

Source: WEL: Occupational Health and Safety Act, R.R.O. 1990, Regulation 833, CONTROL OF EXPOSURE TO BIOLOGICAL OR CHEMICAL AGENTS (Ontario)

Saskatchewan (SK): Occupational Health and Safety Act, 1993. O-1.1 REG 1 Occupational Health and Safety Regulations, 1996.

Sk: The substance can be readily absorbed through intact skin.

Biological limit value Not established.

Exposure controls

Appropriate engineering controls

Ensure operatives are trained to minimise exposures. Ensure adequate ventilation. or Use appropriate containment. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Guarantee that the eye flushing systems and safety showers are located close to the working place.

Individual protection measures, such as personal protective equipment (PPE)

Keep good industrial hygiene. Wear appropriate personal protective equipment, avoid direct contact. Avoid all contact. Wash hands before breaks and after work.

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Eye/face protection



Keep work clothes separately. Wash contaminated clothing before reuse. Do not eat, drink or smoke at the work place.

Wear protective eye glasses for protection against liquid splashes. Wear eye protection with side protection.

Skin protection



Hand protection:

Wear impervious gloves. Gloves should be changed regularly to avoid permeation problems. Breakthrough time of the glove material: refer to the information provided by the gloves' producer. Neoprene or rubber gloves are recommended. Recommended: Polychloroprene - CR (Minimum thickness; 0.5mm), Nitrile rubber (Minimum thickness; 0.4mm)

Body protection:

Wear impervious protective clothing, including boots, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection



In case of inadequate ventilation wear respiratory protection. A suitable mask with filter type A may be appropriate.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Yellow Coloured liquid.
Odour	Amine-like Odour
Odour threshold	Not available.
pH	Not established.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	277°C
Flash point	148°C [Closed cup]
Evaporation rate (Water = 1)	2.83 (BuAc = 1)
Flammability (solid, gas)	Not applicable - Liquid
Upper/lower flammability or explosive limits	Flammable Limits (Lower) (%v/v): 1 @ 185°C Flammable Limits (Upper) (%v/v): >6.4 @ 185°C
Vapour pressure	<1 kPa at 20°C
Vapour density	5 (Air = 1)
Relative density	0.98 g/cm ³ (H ₂ O = 1)
Solubility(ies)	100% (Water)
Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	Not available.
Decomposition Temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

Other information

None

SECTION 10: STABILITY AND REACTIVITY

Reactivity	Stable under normal conditions.
Chemical stability	Stable under normal conditions.
Possibility of hazardous reactions	Stable under normal conditions. Hazardous polymerisation will not occur.
Conditions to avoid	Keep away from heat, sources of ignition and direct sunlight.
Incompatible materials	Keep away from: Oxidizing agents and Acids. May be corrosive to metals. (Aluminium, Copper and Zinc).

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Hazardous decomposition product(s)

Decomposes in a fire giving off toxic fumes: Nitrogen oxides, Carbon monoxide and Carbon dioxide.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity - Ingestion

Based upon the available data, the classification criteria are not met.

Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 2000 mg/kg bw/day.

Acute toxicity - Inhalation

Based upon the available data, the classification criteria are not met.

Acute Toxicity Estimate Mixture Calculation: Estimated LC50 >20.0 mg/l.

Acute toxicity - Skin Contact

Acute toxicity (Dermal) - Category 4: Harmful in contact with skin.

Acute Toxicity Estimate Mixture Calculation: Estimated LC50 > 1085 mg/kg bw/day.

Triethylenetetramine

Acute toxicity (Dermal) - Category 4

LD50 (skin,rabbit) mg/kg: 805 (Journal of Industrial Hygiene and Toxicology)

2-Piperazine-1-ethylamine

Acute toxicity (Dermal) - Category 3

LD50 (skin,rabbit) mg/kg: 866 (Smyth, 1962)

3,6,9-Triazaundecamethylenediamine

Acute toxicity (Dermal) - Category 4

No data

2,2'-Iminodiethylamine

Acute toxicity (Dermal) - Category 4

LD50 (skin,rabbit) mg/kg: 1045 (Unnamed, 1948)

Skin corrosion/irritation

Skin corrosion/irritation - Category 1: Causes severe skin burns and eye damage.

Triethylenetetramine

Skin corrosion/irritation - Category 1B

No data

2-(2-Aminoethylamino)ethanol

Skin corrosion/irritation - Category 1B

Corrosive to rabbit skin (OECD 404)

2-Piperazine-1-ethylamine

Skin corrosion/irritation - Category 1B

Corrosive (Unnamed, 1958)

3,6,9-Triazaundecamethylenediamine

Skin corrosion/irritation - Category 1B

No data

2,2'-Iminodiethylamine

Skin corrosion/irritation - Category 1B

Corrosive (Unnamed, 1957)

Serious eye damage/irritation

Eye damage, category 1: Causes serious eye damage.

2-Piperazine-1-ethylamine

Eye damage, category 1

Causes serious eye damage. (Unnamed, 1958)

2,2'-Iminodiethylamine

Eye damage, category 1

Causes serious eye damage. (Unnamed, 1970)

Respiratory or skin sensitization

Skin sensitization - Category 1: May cause an allergic skin reaction.

Triethylenetetramine

Skin sensitization - Category 1

No data

2-(2-Aminoethylamino)ethanol

Skin sensitization - Category 1

Sensitisation (mouse) - Positive (OECD 429)

2-Piperazine-1-ethylamine

Skin sensitization - Category 1

Sensitisation (guinea pig) - Positive (OECD 406)

3,6,9-Triazaundecamethylenediamine

Skin sensitization - Category 1

No data

2,2'-Iminodiethylamine

Skin sensitization - Category 1

Sensitisation (mouse) - Positive (OECD 429)

Germ cell mutagenicity

Based upon the available data, the classification criteria are not met.

Carcinogenicity

Based upon the available data, the classification criteria are not met.

Reproductive toxicity

Reproductive toxicity - Category 1B: May damage the unborn child. Suspected of damaging fertility.

Reproductive toxicity - Effects on or via lactation: May cause harm to breast-fed children.

2-(2-Aminoethylamino)ethanol

Reproductive toxicity - Category 1B

NOAEL 250 mg/kg bw/day (OECD 421)

Reproductive toxicity - Effects on or via lactation

NOAEL 50 mg/kg bw/day (OECD 414)

2-Piperazine-1-ethylamine

Reproductive toxicity - Category 1B

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STOT - single exposure	NOAEL 75 mg/kg bw/day (OECD 414)
STOT - repeated exposure	Based upon the available data, the classification criteria are not met. Specific target organ toxicity — repeated exposure - Category 1: Causes damage to organs through prolonged or repeated exposure.
2-Piperazine-1-ethylamine	Specific target organ toxicity — repeated exposure - Category 1 Oral: NOAEL 2000 mg/l (OECD 422) Inhalation: NOEC 0.2 mg/m ³ (OECD 413) Dermal: NOEL >1000 mg/kg bw/day (OECD 410)
Aspiration hazard	Based upon the available data, the classification criteria are not met.
Other information	None known.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity	Aquatic toxicity, Chronic - Category 3; Harmful to aquatic life with long lasting effects.
Triethylenetetramine	Estimated Mixture LC50 > 10 ≤ 100 mg/l. (Fish) Aquatic toxicity, Chronic - Category 3 Acute: EC50 (Daphnia magna) 31.1 mg/l (48 hour) (Unnamed, 1989) Chronic: No data
2-Piperazine-1-ethylamine	Aquatic toxicity, Chronic - Category 3 Acute: EC50 (Daphnia magna) 58 mg/l (48 hour) (OECD 202) Chronic: No data
3,6,9-Triazaundecamethylenediamine	Aquatic toxicity, Chronic - Category 2 Acute: No data Chronic: No data
Persistence and degradability	No data for the mixture as a whole. Part of the components are poorly biodegradable.
Bioaccumulative potential	The product has low potential for bioaccumulation.
Mobility in soil	The product is predicted to have high mobility in soil. Soluble in water.
Other adverse effects	None known.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods	Dispose of this material and its container as hazardous waste. Send after pre-treatment to a appropriate hazardous waste incinerator facility according to legislation.
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SECTION 14: TRANSPORT INFORMATION

	ADR/RID	IMDG	IATA/ICAO
14.1 UN number	UN 2259	UN 2259	UN 2259
14.2 UN proper shipping name	TRIETHYLENETHETRA	TRIETHYLENETHETRA	TRIETHYLENETHETRA
14.3 Transport hazard class(es)	MINE	MINE	MINE
14.4 Packing group	8	8	8
14.5 Environmental hazards	III	III	III
14.6 Special precautions for user	Not classified	Not classified as a Marine Pollutant.	Not classified
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	See Section: 2		
	Not applicable		

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

CEPA, Domestic Substances List

Triethylenetetramine: Yes

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CEPA, Priority Substances List	2-(2-Aminoethylamino)ethanol: Yes
CEPA, List of Toxic Substances (Schedule 1)	2-Piperazin-1-ylethylamine: Yes
CEPA, National Pollutant Release Inventory	3,6,9-Triazaundecamethylenediamine: Yes
CEPA, Environmental Emergency Regulations	2,2'-Iminodiethylamine: Yes
Non-Regional	All chemicals are not listed
IARC Monographs, List of Classifications	All chemicals are not listed
	All chemicals are not listed
	All chemicals are not listed
	All chemicals are not listed
	All chemicals are not listed

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: Not applicable – V1.0

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References:

Existing Safety Data Sheet (SDS).

EU: Harmonised Classification(s) for Triethylenetetramine (CAS No. 112-24-3), 2-(2-Aminoethylamino)ethanol (CAS No. 111-41-1), 2-Piperazin-1-ylethylamine (CAS No. 140-31-8), 3,6,9-Triazaundecamethylenediamine (CAS No. 112-57-2), and 2,2'-Iminodiethylamine (CAS No. 111-40-0). Existing ECHA registration(s) for 2-(2-Aminoethylamino)ethanol (CAS No. 111-41-1), 2-Piperazin-1-ylethylamine (CAS No. 140-31-8), 2,2'-Iminodiethylamine (CAS No. 111-40-0).

Literature References:

1. Journal of Industrial Hygiene and Toxicology. (Cambridge, MA) V.18-31, 1936-49. For publisher information, see AEHLAU. 31,60,1949
2. Smyth, H.F. et al, 1962, Am Ind Hyg Assoc J, vol 23 ; p. 95

LEGEND

LTEL: Long Term Exposure Limit

DNEL: Derived No Effect Level

PBT: PBT: Persistent, Bioaccumulative and Toxic

IARC: International Agency for Research on Cancer

OSHA = Occupational Safety and Health Administration

ACGIH: American conference of Governmental Industrial Hygiene

TLV: Threshold Limit Value (ACGIH)

VOC: Volatile Organic Compound

CEPA (Canadian Environmental Protection Act)

STEL: Short Term Exposure Limit

PNEC: Predicted No Effect Concentration

vPvB: very Persistent and very Bioaccumulative

NTP: National Toxicology Program

NIOSH: National Institute for Occupational Safety and Health Technical Information Center

BEI: Biological Exposure Indices (ACGIH)

TWA: Time Weighted Average

EU: European Union

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