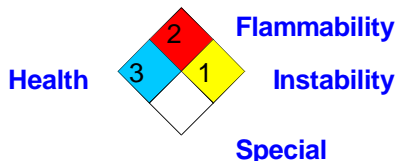


Material Safety Data Sheet

Emergency phone: CHEMTREC Number
(800) 424-9300



Health	3
Fire hazard	2
Reactivity	1
Personal protection	C

Section 1. Chemical product and company identification

Product name : ENTHONE® CATALYST 77
Product code : 135337
Material uses : Specialty chemicals for the electronics and surface finishing industries.
Manufacturer : Enthone Inc
 350 Frontage Road
 West Haven, CT 06516
 Phone: (203) 799-4917
 Fax: (203) 799-8179
 www.cooksonelectronics.com

Enthone OMI de Mexico S.A. de C.V.
 Norte 59 No. 896
 Col. Industrial Vallejo
 Mexico, D.F. 02300
 Mexico
 Phone: 52 55 5078 3904
 Fax: 52 555 567 6326
 www.cooksonelectronics.com
 Tel. local de emergencias: 080
 Tel. de emergencias en
 transportacion: 01 800 0021 400 ;
 (55) 5559 1588

Validation date : 12/15/2005. **Supersedes Date** : 8/11/2005
Prepared by : R. Hescok

Section 2. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
tetraethylenepentamine	112-57-2	40-50
2-butoxyethanol	111-76-2	20-30
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2	10-20
1,2-ethanediamine, n-[3-(trimethoxysilyl)propyl]-	1760-24-3	5-10
Methoxysilane		1-5
methanol	67-56-1	0.1-1.0

Any component not listed in Section 2 is non-regulated or present in the product in concentrations below legal disclosure limits

All ingredients comply with applicable rules or orders under United States TSCA and Canadian CEPA regulations.

Section 3. Hazards identification

Physical state	: Liquid.
Odor	: Ammoniacal.
Emergency overview	: Danger! CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. BIRTH DEFECT HAZARD CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECT. HARMFUL IF INHALED. MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL WHICH MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: BLOOD, KIDNEYS, LIVER, MUCOUS MEMBRANES, BLADDER, RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. POSSIBLE CANCER HAZARD CONTAINS MATERIAL WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA. COMBUSTIBLE LIQUID AND VAPOR. VAPOR MAY CAUSE FIRE. Do not ingest. Do not get in eyes, on skin or clothing. Do not breathe vapor or mist. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure. Avoid exposure during pregnancy.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Eye contact	: Corrosive to eyes.
Skin contact	: Harmful in contact with skin. Corrosive to the skin. May cause sensitization by skin contact.
Inhalation	: Toxic by inhalation. Corrosive to the respiratory system. May cause sensitization by inhalation.
Ingestion	: Harmful if swallowed. May cause burns to mouth, throat and stomach.
Potential chronic health effects	
Target organs	: Contains material which may cause damage to the following organs: blood, kidneys, liver, mucous membranes, bladder, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
Over-exposure signs/symptoms	: 1,2-ethanediamine, n-[3-(trimethoxysilyl)propyl]- : Irritating to eyes and skin. and mucous membranes. Direct contact with the eyes can cause irreversible damage including blindness. Inhalation: Vapors may cause drowsiness and dizziness. Ingestion: Irritating to mouth, throat and stomach. Prolonged or repeated exposure may cause allergic reaction, nervous system damage. Methoxysilane : Irritating to mouth, throat and stomach. Exposure can cause nausea, headache and vomiting. and drowsiness/fatigue. Methanol : Inhalation: Symptoms and signs include headaches, dizziness, fatigue, muscular weakness, drowsiness and, in extreme cases, loss of consciousness. Permanent vision changes, loss of vision, or total blindness. Ingestion: Harmful if ingested. May be fatal or cause blindness if swallowed. Ingestion may cause nausea, weakness and central nervous system effects. Aspiration hazard if swallowed- can enter lungs and cause damage. Prolonged or repeated exposure to methyl alcohol may cause damage to the kidneys, liver, lungs, blood and central nervous system. Skin: Repeated or prolonged contact with irritants may cause dermatitis. Absorption through skin can cause symptoms similar to ingestion May cause specific developmental abnormalities. Tetraethylenepentamine : HARMFUL IF ABSORBED THROUGH SKIN, IF SWALLOWED OR INHALED. Sensitized persons may subsequently show asthmatic symptoms when exposed to atmospheric concentrations well below the OEL Medical conditions aggravated by overexposure: pulmonary - chronic lung disease, bronchial

constriction, dermatitis. Aspiration hazard if swallowed- can enter lungs and cause damage. Absorption through skin can cause symptoms similar to ingestion. Ingestion may cause nausea, weakness and central nervous system effects. Direct contact with the eyes can cause irreversible damage including blindness.

2-butoxyethanol: Inhalation: coughing, headache, abdominal cramps/pain, nausea/vomiting, diarrhea, shortness of breath, loss of consciousness/coma. Narcotic in high concentrations. Causes damage to the following organs: kidneys, liver, heart, and bone marrow. Ingestion: Can cause gastrointestinal disturbances. Symptoms similar to those listed under inhalation. Skin: pain, swelling, Defatting to the skin. and skin lesion/eczema. 2-butoxyethanol and its acetate are readily absorbed through the skin and will cause harmful effect on the blood. Symptoms similar to those listed under inhalation. Eyes: blinking, redness or swelling and Possible corneal damage.

2,4,6-Tris(dimethylaminomethyl)phenol: Eye contact can result in corneal damage or blindness. May cause central nervous system effects.- headache, nausea/vomiting, dizziness/vertigo, mental confusion/disorientation and breathing difficulty-shortness of breath. Ingestion: May cause burns to mouth, throat and stomach. Over-exposure signs/symptoms: respiratory tract damage.

Carcinogenicity

- : Classified A3 (Proven for animal.) by ACGIH [2-butoxyethanol]. Classified 3 (Not classifiable for human.) by IARC [2-butoxyethanol]. Classified A4 (Not classifiable for human or animal.) by ACGIH [1,2-Diaminoethane].

See toxicological information (section 11)

Section 4. First aid measures

First aid

Eye contact

- : Provide a readily accessible eyewash facility and quick drench safety shower. Immediately flush eyes with running water for at least 30 minutes, keeping eyelids open. Get medical attention immediately.

Skin contact

- : Evacuate the victim to a safe area as soon as possible. Ensure that eyewash stations and safety showers are proximal to the work-station location. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Inhalation

- : If inhaled, remove to fresh air. If exposed person is not breathing, give artificial respiration or oxygen applied by trained personnel. Get medical attention.

Ingestion

- : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately.

Protection of first-aiders

- : No action shall be taken involving any personal risk or without suitable training. If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a 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, or wear gloves. Wear suitable protective clothing.

Section 5. Fire fighting measures

NFPA Hazard identification number Flammability

- : 2

Auto-ignition temperature

- : The lowest known value is 244°C (471.2°F) (2-butoxyethanol).

Flash point

- : Closed cup: 54.44 to 60.556°C (130 to 141°F).

Flammable limits

- : Not available.

Products of combustion

- : These products are carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...). Some metallic oxides.

Fire hazards in presence of various substances

- : Flammable in presence of open flames, sparks and static discharge, of heat.

Special remarks on fire hazards

- : The initial flash point of this product is >141F, but may decrease over time to 130F due to silane hydrolysis liberating methanol.

- Explosion hazards in presence of various substances.** : Not available.
- Fire fighting media and instructions** : In case of fire, use water spray (fog), foam, dry chemicals, or CO₂.
- Combustible liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.
- Special protective equipment for fire-fighters** : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Do not touch or walk through spilled material.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Do not clean-up or dispose except under supervision of a specialist. Keep unnecessary and unprotected personnel from entering. Follow your company's spill procedures. Avoid all possible sources of ignition (spark or flame). Avoid contact with eyes, skin and clothing. Wear suitable protective clothing. Avoid breathing vapors of this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent. 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. For small spills add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion proof means to transfer material to a sealed, appropriate container for disposal. Dike large spills and use a non-sparking or explosion proof means to transfer material to an appropriate container for disposal. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of according to all federal, state and local applicable regulations.

Section 7. Handling and storage

- Handling** : Do not ingest. Do not get in eyes, on skin or on clothing. Keep container closed. Use only with adequate ventilation. Do not breathe vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.
- Storage** : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).
- Incompatibility with various substances:** : Reactive with oxidizing agents, moisture.
water
- Hazardous decomposition products:** : carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...), methanol

Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, 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. The engineering controls also need to keep gas, vapor or dust concentrations below any explosive limits. Use explosion-proof ventilation equipment.

Personal protection

- Eyes** : Avoid contact with 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** : Avoid contact with skin and clothing. 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.
- 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** : Avoid contact with skin. Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Do not clean-up or dispose except under supervision of a specialist. Keep unnecessary and unprotected personnel from entering. Follow your company's spill procedures. Avoid contact with eyes, skin and clothing. Wear suitable protective clothing and eye/face protection. 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. Avoid breathing vapors of this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent. 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.

<u>Ingredient name</u>	<u>CAS number</u>	<u>Exposure limits</u>
Tetraethylenepentamine	112-57-2	AIHA WEEL (United States, 1/2004). Skin TWA: 5 mg/m ³ 8 hour(s). Form: All forms
2-butoxyethanol	111-76-2	ACGIH TLV (United States, 1/2004). Notes: 2002 Adoption. TWA: 20 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 6/2001). Skin TWA: 24 mg/m ³ 10 hour(s). Form: All forms TWA: 5 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 6/1993). Skin TWA: 240 mg/m ³ 8 hour(s). Form: All forms TWA: 50 ppm 8 hour(s). Form: All forms OSHA PEL 1989 (United States, 3/1989). Skin TWA: 120 mg/m ³ 8 hour(s). Form: All forms TWA: 25 ppm 8 hour(s). Form: All forms
Methanol	67-56-1	ACGIH TLV (United States, 9/2004). Skin Notes: Identifies substances identified in the BEI documentation for Methemoglobin inducers (for which methemoglobin is the principle toxicity) and organophosphorous cholinesterase inhibitors are part of this notation. STEL: 328 mg/m ³ 15 minute(s). Form: All forms STEL: 250 ppm 15 minute(s). Form: All forms TWA: 262 mg/m ³ 8 hour(s). Form: All forms TWA: 200 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 6/2001). Skin STEL: 325 mg/m ³ 15 minute(s). Form: All forms STEL: 250 ppm 15 minute(s). Form: All forms TWA: 260 mg/m ³ 10 hour(s). Form: All forms TWA: 200 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 6/1993). TWA: 260 mg/m ³ 8 hour(s). Form: All forms TWA: 200 ppm 8 hour(s). Form: All forms OSHA PEL 1989 (United States, 3/1989). Skin STEL: 325 mg/m ³ 15 minute(s). Form: All forms STEL: 250 ppm 15 minute(s). Form: All forms

TWA: 260 mg/m³ 8 hour(s). Form: All forms
TWA: 200 ppm 8 hour(s). Form: All forms

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Physical state	: Liquid.
Color	: Amber.
Odor	: Ammoniacal.
pH	: Not available.
Boiling/condensation point	: 143.33°C (290°F)
Melting/freezing point	: May start to solidify at -39.99°C (-40°F) based on data for: Tetraethylenepentamine. Weighted average: -49.99°C (-58°F)
Critical temperature	: The lowest known value is 367.9°C (694.2°F) (2-butoxyethanol).
Specific gravity	: 0.96 (Water = 1)
Vapor pressure	: The highest known value is <0.001 kPa (<0.01 mm Hg) (at 20°C) (Tetraethylenepentamine). Weighted average: 0.001 kPa (0.008 mm Hg) (at 20°C)
Vapor density	: The highest known value is 6.52 (Air = 1) (Tetraethylenepentamine). Weighted average: 5.7 (Air = 1)
Odor threshold	: Not available.
Evaporation rate	: Not available.
Ionicity (in water)	: Not available.
Dispersion properties	: See solubility in water.
Solubility	: Soluble in cold water, hot water.

Section 10. Stability and reactivity

Stability and reactivity	The product is stable.
Incompatibility with various substances:	: Reactive with oxidizing agents, moisture. water
Other hazardous decomposition products	: carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂ ...), methanol
Hazardous polymerization	: Will not occur.

Section 11. Toxicological information

Toxicity data

<u>Ingredient name</u>	<u>CAS number</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
tetraethylenepentamine	112-57-2	LD50	3990 mg/kg	Oral	Rat
2-butoxyethanol		LD50	470 mg/kg	Oral	Rat
		LD50	300 mg/kg	Oral	Rabbit
		LD50	1200 mg/kg	Oral	Guinea pig
		LD50	220 mg/kg	Dermal	Rabbit
		LC50	450 ppm (4 hour(s))	Inhalation	Rat
		LC50	700 ppm (7 hour(s))	Inhalation	Mouse
2,4,6-tris(dimethylaminomethyl)phe	90-72-2	LD50	1200 mg/kg	Oral	Rat
		LD50	1280 mg/kg	Dermal	Rat
		LD50	1400 mg/kg	Dermal	Rabbit
methanol	67-56-1	LD50	5628 mg/kg	Oral	Rat
		LD50	14200 mg/kg	Oral	Rabbit
		LD50	7300 mg/kg	Oral	Mouse

Continued on next page

LD50	15800 mg/kg	Dermal	Rabbit
LDLo	143 mg/kg	Oral	human
LDLo	428 mg/kg	Oral	human
LDLo	6422 mg/kg	Oral	man
LDLo	393 mg/kg	Dermal	Monkey.
LC50	64000 ppm (4 hour(s))	Inhalation	Rat

IDLH : Not available.

Chronic effects on humans : **CARCINOGENIC EFFECTS:** Classified A3 (Proven for animal.) by ACGIH [2-butoxyethanol]. Classified 3 (Not classifiable for human.) by IARC [2-butoxyethanol]. Classified A4 (Not classifiable for human or animal.) by ACGIH [1,2-Diaminoethane].
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [2-butoxyethanol].
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male, Development toxin [POSSIBLE] [2-butoxyethanol]. Classified Development toxin [PROVEN] [Methanol].
Contains material which may cause damage to the following organs: blood, kidneys, liver, mucous membranes, bladder, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

California prop. 65 : California prop. 65: No products were found.
Enthone has not conducted specific studies on the toxicity of this product.

Section 12. Ecological information

Ecotoxicity data

<u>Ingredient name</u>	<u>Species</u>	<u>Period</u>	<u>Result</u>
2-butoxyethanol	Lepomis macrochirus (LC50)	96 hour(s)	1490 mg/l
methanol	Daphnia magna (EC50)	48 hour(s)	>10000 mg/l
	Oncorhynchus mykiss (EC50)	48 hour(s)	13200 mg/l
	Lepomis macrochirus (EC50)	48 hour(s)	16000 mg/l
	Pimephales promelas (LC50)	96 hour(s)	>100 mg/l
	Daphnia magna (LC50)	96 hour(s)	>100 mg/l
	Lepomis macrochirus (LC50)	96 hour(s)	15400 mg/l


Enthone has not conducted specific studies on the ecotoxicity or enviromental fate of this product.

Section 13. Disposal considerations

Waste disposal : Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN2924	FLAMMABLE LIQUIDS, CORROSIVE, N.O.S. (METHANOL CONTAINS ALIPHATIC AMINE)	3	II		ERG# 132

Section 15. Regulatory information

United States

U.S. Federal regulations : All ingredients comply with applicable rules or orders under United States TSCA and Canadian CEPA regulations.

TSCA 12(b) annual export notification: No products were found.

TSCA 12(b) one time export: No products were found.

TSCA 5(a)2 final significant rules: No products were found.

Clean air act (CAA) 112 accidental release prevention: 1,2-Diaminoethane

Clean air act (CAA) 112 regulated flammable substances: No products were found.

Clean air act (CAA) 112 regulated toxic substances: 1,2-Diaminoethane

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
SARA 313	: 2-butoxyethanol	111-76-2	20-30

State regulations : No products were found.

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (TOXIC).
Class E: Corrosive liquid.

Ingredients not listed on the CEPA DSL:
Methoxysilane

Section 16. Other information

Definition of Terms

ACGIH	American Conference of Governmental Industrial Hygienists
Ceiling	Maximum exposure limit defined by OSHA
CAS	Chemical Abstract Service
IARC	International Agency for Research on Cancer
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
RTK	Right to Know
SARA	Superfund Amendments and Reauthorization Act
STEL	Short Term Exposure Limit
TLV	ACGIH Threshold Limit Value
TLV-C	ACGIH Threshold Limit Value, Ceiling
TRADE SECRET	Claimed as allowed under 29CFR§1910.1200
TSCA	Toxic Substances Control Act
PPE	Personal Protection Equipment
CEPA	Canadian Environmental Protection Act
DSL	Domestic Substance List
NDSL	Non-Domestic Substance List

Continued on next page

NSN

New Substance Notification Rules

Disclaimer

This Material Safety Data Sheet may be used to comply with OSHA's Hazard Communication Standard, 29CFR§1910.1200. This Material Safety Data Sheet may also be used to comply with the requirements of Workplace Hazardous Materials Information System, of the Controlled Products Regulations, under the Hazardous Products Act. Enthone furnishes the data contained herein in good faith without liability or legal responsibility for same whatsoever, and no warranty or guarantee, express or implied, is made with respect to such data; nor does Enthone grant permission, recommendation, or inducement to infringe any patent whether owned by Enthone or others. The data is offered solely for your information and consideration. Since conditions of use are beyond Enthone's control, user assumes all responsibility and risk.



Cookson Electronics