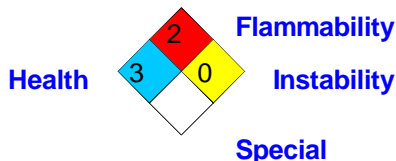


Material Safety Data Sheet

Emergency phone: CHEMTREC Number
(800) 424-9300



| | |
|---------------------|---|
| Health | 3 |
| Fire hazard | 2 |
| Reactivity | 1 |
| Personal protection | G |

Section 1. Chemical product and company identification

Product name : ENTHONE® CATALYST 9
Product code : 135196
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 deMexico 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** : 5/24//2005
Prepared by : R. Hescock

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 | 40-50 |

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 : Amine like.
Emergency overview : Danger!

CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS.
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.

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**

: **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.

Carcinogenicity

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

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: 79.44°C (175°F). (Setaflash)
- Flammable limits** : Not available.
- Products of combustion** : These products are carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...).
- Fire hazards in presence of various substances** : Not available.
- 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, acids, alkalis.
aldehydes, Acrylate, organic halides, ketones, epoxides
:

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 |

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

| | |
|-----------------------------------|--|
| Physical state | : Liquid. |
| Color | : Amber. |
| Odor | : Amine like. |
| pH | : Not available. |
| Boiling/condensation point | : 148.89°C (300°F) |
| Melting/freezing point | : May start to solidify at -39.99°C (-40°F) based on data for: Tetraethylenepentamine. Weighted average: -54.99°C (-67°F) |
| Critical temperature | : The lowest known value is 367.9°C (694.2°F) (2-butoxyethanol). |
| Specific gravity | : 0.95 (Water = 1) |
| Vapor pressure | : The highest known value is <0.001 kPa (<0.01 mm Hg) (at 20°C) (Tetraethylenepentamine). |
| Vapor density | : The highest known value is 6.52 (Air = 1) (Tetraethylenepentamine). Weighted average: 5.29 (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, acids, alkalis.
aldehydes, Acrylate, organic halides, ketones, epoxides
- 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 | 111-76-2 | 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 |

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].
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].
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 |

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


Continued on next page

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 | UN3267 | CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S (PRIMARY ALIPHATIC AMINE) | 8 | III |  | #153 |

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: No products were found.

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

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

| | <u>Product name</u> | <u>CAS number</u> | <u>Concentration</u> |
|-----------------|---------------------|-------------------|----------------------|
| SARA 313 | : 2-butoxyethanol | 111-76-2 | 40-50 |

State regulations : No products were found.

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2B: Material causing other toxic effects (TOXIC).
Class E: Corrosive liquid.

All ingredients in this product are found on the CEPA DSL.

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 |

Continued on next page

| | |
|--------------|--|
| 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 |
| 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