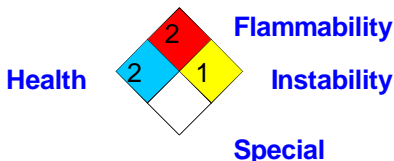


Material Safety Data Sheet

Emergency phone: CHEMTREC Number
(800) 424-9300



Health	2
Fire hazard	2
Reactivity	1
Personal protection	C

Section 1. Chemical product and company identification

Product name : ENTHONE® 50-400R
Product code : 135668
Material uses : Specialty chemicals for the electronics and surface finishing industries.
Manufacturer : Enthone Inc
 Enthone OMI deMexico S.A. de C.V.
 350 Frontage Road
 Norte 59 No. 896
 West Haven, CT 06516
 Col. Industrial Vallejo
 Mexico, D.F. 02300
 Phone: (203) 799-4917
 Mexico
 Fax: (203) 799-8179
 Phone: 52 55 5078 3904
 www.cooksonelectronics.com
 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 : 4/17/2006. **Supersedes Date** : No previous validation.

Prepared by : Angela Rath

Section 2. Composition, information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
Resins and Polymers		30-40
di ethylene glycol monoethyl ether acetate	112-15-2	10-20
dipropylene glycol methyl ether	34590-94-8	5-10
2-methoxy-1-methylethyl acetate	108-65-6	5-10
barium sulfate	7727-43-7	5-10
Proprietary Resins.		1-5
titanium dioxide	13463-67-7	1-5
silica, amorphous, fumed	7631-86-9	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	: Mild.
Emergency overview	: Warning! CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL WHICH MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: KIDNEYS, LIVER, MUCOUS MEMBRANES, 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. Avoid prolonged contact with eyes, skin and clothing. Avoid breathing 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	: Irritating to eyes.
Skin contact	: Harmful in contact with skin. Irritating to skin. May cause sensitization by skin contact.
Inhalation	: Irritating to respiratory system.
Ingestion	: Harmful if swallowed.
Potential chronic health effects	
Target organs	: Contains material which may cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
Over-exposure signs/symptoms	: dipropylene glycol methyl ether : May be slightly toxic by inhalation, in contact with skin or if swallowed. Can cause dizziness, light-headedness, headache, nausea and blurred vision. Prolonged exposure may cause narcotic effect. Resins and Polymers : Irritating to eyes, respiratory system and skin. MAY BE HARMFUL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED. Material is irritating to mucous membranes and upper respiratory tract. May cause allergic skin reactions with repeated exposure. Di ethylene glycol monoethyl ether acetate : Inhalation and Ingestion: stomach pains, nausea or vomiting, diarrhea and central nervous system depression. Harmful if absorbed through the skin. Repeated or prolonged exposure to the substance can produce kidney damage. 2-Methoxy-1-methylethyl acetate : May be irritating to eyes, skin and respiratory system. Absorbed through skin. May be harmful if inhaled. May be harmful if swallowed. May cause damage to the following organs: liver, kidneys barium sulfate : Irritating to eyes, respiratory system and skin. Prolonged exposure to dust particles may result in baritosis, a form of benign pneumoconiosis. Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea. Titanium dioxide : Irritating to eyes, respiratory system and skin. If this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use. These hazards are associated with airborne exposure to the particulate form of this chemical. If this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use. silica, amorphous, fumed : Inhalation: coughing, shortness of breath/breathing difficulty . These hazards are associated with airborne exposure to the particulate form of this chemical. If this product is a liquid, exposure to this particulate is unlikely under ordinary

- conditions of use.
- Carcinogenicity** : Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Titanium dioxide]. Classified 3 (Not classifiable for humans.) by IARC [silica, amorphous, fumed].
- Special remarks on chronic effects on humans** : **Titanium dioxide:** Carcinogen status based on inhalation of particulate form of this chemical. If this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use.
silica, amorphous, fumed: Carcinogen status based on inhalation of particulate form of this chemical. Because this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use.

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 15 minutes, keeping eyelids open. Get medical attention immediately.
- Skin contact** : Move the victim to a safe area as soon as possible. Ensure that eyewash stations and safety showers are close to the workstation 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. Clean shoes thoroughly 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 potentially dangerous quantities of this material have been swallowed, call a physician immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wear suitable protective clothing.

Section 5. Fire fighting measures

- NFPA Hazard identification number Flammability** : 2
- Auto-ignition temperature** : The lowest known value is 260°C (500°F) (Di ethylene glycol monoethyl ether acetate).
- Flash point** : Closed cup: 65.5°C (149.9°F). (Setaflash)
- Flammable limits** : Not available.
- Products of combustion** : These products are carbon oxides (CO, CO₂), sulfur oxides (SO₂, SO₃ etc.). Some metallic oxides.
- Fire hazards in the presence of various substances** : Not available.
- Hazardous polymerization** : Will not occur.
- Explosion hazards in the presence of various substances** : Not available.
- Fire-fighting media and instructions** : In case of fire, use water spray (fog), foam, dry chemical or CO₂.

Combustible liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas or travel a considerable distance to a 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 face-piece 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 of, 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. Ensure an MSHA/NIOSH-approved respirator or equivalent is used. 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 sealable, 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. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing 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** : 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.
- Hazardous decomposition products:** : carbon oxides (CO, CO₂), sulfur oxides (SO₂, SO₃ etc.), nitrogen oxides (NO, NO₂ etc.)

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 lower 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 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 of, 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. Ensure an MSHA/NIOSH-approved respirator or equivalent is used. 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.

Ingredient name CAS number Exposure limits

dipropylene glycol methyl ether 34590-94-8

ACGIH TLV (United States, 9/2004). Skin
STEL: 909 mg/m³ 15 minute/minutes. Form: All forms
STEL: 150 ppm 15 minute/minutes. Form: All forms
TWA: 606 mg/m³ 8 hour/hours. Form: All forms
TWA: 100 ppm 8 hour/hours. Form: All forms

NIOSH REL (United States, 6/2001). Skin
STEL: 900 mg/m³ 15 minute/minutes. Form: All forms
STEL: 150 ppm 15 minute/minutes. Form: All forms
TWA: 600 mg/m³ 10 hour/hours. Form: All forms
TWA: 100 ppm 10 hour/hours. Form: All forms

OSHA PEL (United States, 6/1993). Skin
TWA: 600 mg/m³ 8 hour/hours. Form: All forms
TWA: 100 ppm 8 hour/hours. Form: All forms

OSHA PEL 1989 (United States, 3/1989). Skin
STEL: 900 mg/m³ 15 minute/minutes. Form: All forms
STEL: 150 ppm 15 minute/minutes. Form: All forms
TWA: 600 mg/m³ 8 hour/hours. Form: All forms
TWA: 100 ppm 8 hour/hours. Form: All forms

2-Methoxy-1-methylethyl acetate 108-65-6

AIHA WEEL (United States, 1/2004).
TWA: 100 ppm 8 hour/hours. Form: All forms

barium sulfate 7727-43-7

ACGIH TLV (United States, 2001).
TWA: 10 mg/m³ 8 hour/hours.
TWA: 10 mg/m³ 8 hour/hours. Form: All forms
NIOSH REL (United States, 6/2001).
TWA: 5 mg/m³ 10 hour/hours. Form: Respirable fraction
TWA: 10 mg/m³ 10 hour/hours. Form: Total

OSHA PEL (United States, 6/1993).
TWA: 0.5 mg/m³ 8 hour/hours. Form: All forms
TWA: 5 mg/m³ 8 hour/hours. Form: Respirable fraction
TWA: 15 mg/m³ 8 hour/hours. Form: Total dust

OSHA PEL 1989 (United States, 3/1989).
TWA: 0.5 mg/m³ 8 hour/hours. Form: All forms
TWA: 5 mg/m³ 8 hour/hours. Form: Respirable fraction
TWA: 10 mg/m³ 8 hour/hours. Form: Total dust

Titanium dioxide 13463-67-7

ACGIH TLV (United States, 5/2004). Notes: Substance identified by other sources as a suspected or confirmed human carcinogen. 1996 Adoption Substances for which the TLV is higher than the OSHA Permissible Exposure Limit (PEL) and/or the NIOSH Recommended Exposure Limit (REL). See CFR 58(124) :36338-33351, June 30, 1993, for revised OSHA PEL. Refers to Appendix A -- Carcinogens.

TWA: 10 mg/m³ 8 hour/hours. Form: All forms
OSHA PEL (United States, 6/1993).
TWA: 15 mg/m³ 8 hour/hours. Form: Total dust

silica, amorphous, fumed 7631-86-9

OSHA PEL 1989 (United States, 3/1989).

TWA: 10 mg/m³ 8 hour/hours. Form: Total dust

NIOSH REL (United States, 6/2001).

TWA: 6 mg/m³ 10 hour/hours. Form: All forms

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Physical state	: Liquid.
Color	: Ultramarine Blue
Odor	: Mild.
pH	: Not available.
Boiling/condensation point	: 160°C (320°F)
Melting/freezing point	: May start to solidify at -75°C (-103°F) based on data for: 2-Methoxy-1-methylethyl acetate. Weighted average: -79.2°C (-110.6°F)
Critical temperature	: Not available.
Specific gravity	: 1.33 (Water = 1)
Vapor pressure	: Not available.
Vapor density	: The highest known value is 5.11 (Air = 1) (dipropylene glycol methyl ether). Weighted average: 4.88 (Air = 1)
Odor threshold	: Not available.
Evaporation rate	: Not available.
Ionicity (in water)	: Not available.
Dispersibility properties	: Not available.
Solubility	: Insoluble 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.
Other hazardous decomposition products	: carbon oxides (CO, CO ₂), sulfur oxides (SO ₂ , SO ₃ etc.), nitrogen oxides (NO, NO ₂ etc.)
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>
Resins and Polymers	LD50	>2000 mg/kg	Oral	Rat	
	LD50	>2000 mg/kg	Dermal	Rabbit	
Di ethylene glycol monoethyl ether acetate	LD50	4400 mg/kg	Oral	Rabbit	
	LD50	3930 mg/kg	Oral	Guinea pig	
	LD50	11000 mg/kg	Oral	Rat	
	LD50	15000 mg/kg	Dermal	Rabbit	
dipropylene glycol methyl ether	LD50	7500 mg/kg	Oral	Dog	
	LD50	8532 mg/kg	Oral	Rat	
2-Methoxy-1-methylethyl acetate	LD50	8532 mg/kg	Oral	Rat	
	LD50	>7940 mg/kg	Oral	Rat	
Proprietary Resins.	LD50	>7940 mg/kg	Dermal	Rabbit	
	LD50	>5000 mg/kg	Oral	Rat	
silica, amorphous, fumed	LD50	>5000 mg/kg	Oral	Rat	
	LD50	>2000 mg/kg	Dermal	Rabbit	

Continued on next page

IDLH : Not available.

Chronic effects on humans : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [Titanium dioxide]. Classified 3 (Not classifiable for humans.) by IARC [silica, amorphous, fumed].
Contains material which may cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

Special remarks on chronic effects on humans : **Titanium dioxide:** Carcinogen status based on inhalation of particulate form of this chemical. If this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use.
silica, amorphous, fumed: Carcinogen status based on inhalation of particulate form of this chemical. Because this product is a liquid, exposure to this particulate is unlikely under ordinary conditions of use.

California Prop. 65 : **WARNING:** This product contains chemical/chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Benzene; Acetaldehyde; 1,4-dioxane; Ethylene oxide; Nickel; lead; Mercury; chromium; cadmium; Arsenic
WARNING: This product contains chemical/chemicals known to the state of California to cause reproductive harm (female).: Ethylene oxide; lead
WARNING: This product contains chemical/chemicals known to the state of California to cause reproductive harm (male).: Benzene; lead; cadmium
California prop. 65 (no significant risk level): Benzene; Acetaldehyde: 90 µg/day (inhalation); 1,4-dioxane; Ethylene oxide; lead: 15 µg/day (ingestion); cadmium: 0.05 µg/day (inhalation); Arsenic: 0.06 µg/day (inhalation)
California prop. 65 (Maximum Acceptable Dosage Level): Benzene; Ethylene oxide; lead; cadmium
WARNING: This product contains chemical/chemicals known to the state of California to cause birth defects or other reproductive harm.: Benzene; lead; Mercury; chromium; cadmium
WARNING: This product contains chemical/chemicals known to the state of California to cause cancer.: Benzene; Acetaldehyde; 1,4-dioxane; Ethylene oxide; Nickel; lead; chromium; cadmium; Arsenic

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>
barium sulfate	Daphnia magna (EC50)	48 hour/hours	32 mg/l
Proprietary Resins.	Fish (LC50)	96 hour/hours	>1000 mg/l
titanium dioxide	Daphnia magna (EC50)	48 hour/hours	>1000 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	Not regulated.	-	-	Not available.		Not available.

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: Acetaldehyde

Clean Air Act (CAA) 112 regulated flammable substances: Acetaldehyde

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
di ethylene glycol monoethyl ether acetate	112-15-2	10-20

SARA 313

**State regulations
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-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Ingredients not listed on the CEPA DSL:

Fatty Amide Blend

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