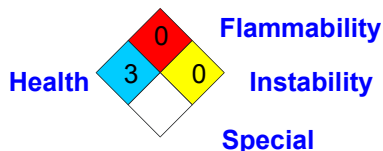


Material Safety Data Sheet

Emergency phone: Enthone Chemtrec #7827
US & Canada: 800 424-9300
Mexico: 01 800 022 1400, (55) 5559 1588



Health	3
Flammability	0
Physical hazards	0
Personal protection	

1. Product and company identification

Product name : MICROFAB® DVF 200 MU
Patent Number : U.S. PATENT NO. 7,670,950
Product Code : 414171
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
 West Haven, CT 06516
 Phone: (203) 934-8611
 Fax: (203) 799-8179
 www.cooksonelectronics.com

Validation date : 8/27/2010. **Supersedes Date** : 4/26/2010.
Prepared by : T. Valverde
 (203)-799-4940

2. Hazards identification

Physical state : Liquid.
Odor : None.
OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview : DANGER!
 This product contains material(s) that are absorbed through the skin. Toxic if swallowed. Corrosive to the eyes, skin, respiratory system and digestive tract. Causes burns. Harmful in contact with skin. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects
Inhalation : Corrosive to the respiratory system. May cause severe irritation or burns. Exposure can cause lung irritation, chest pain and edema, which may be fatal.

2. Hazards identification

- Ingestion** : Toxic if swallowed. Corrosive to the digestive tract. May cause burns to mouth, throat and stomach. Can cause target organ damage. Adverse symptoms may include the following: nausea or vomiting stomach pains Ingestion may cause gastrointestinal irritation and diarrhea.
- Skin** : Corrosive to the skin. Causes burns. Adverse symptoms may include the following: blistering, redness, itching, swelling, pain Harmful in contact with skin. This product contains material(s) that are absorbed through the skin. May cause damage to organs in contact with skin. and symptoms similar to those listed under inhalation or ingestion.
- Eyes** : Corrosive to eyes. Causes burns. Direct contact with the eyes can cause irreversible damage, including blindness.

Potential chronic health effects

- Chronic effects** : Contains material that can cause target organ damage. Adverse symptoms may include the following:
Copper(II) methanesulfonate: Causes pain and burns in contact with skin., eyes, respiratory tract and gastrointestinal tract. Symptoms include: headache, nausea or vomiting, coughing, shortness of breath/breathing difficulty, metal fume fever, discoloration of: skin and hair, metallic taste, anemia. Medical conditions aggravated by over-exposure dermatitis, pulmonary chronic lung disease, ocular.
Methanesulfonic acid:
- Target organs** : Contains material which may cause damage to the following organs: kidneys, liver, mucous membranes, digestive system, upper respiratory tract, skin, eyes.
- Carcinogenicity** : Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.
- Mutagenicity** : No conclusive data is available to indicate product or any component present at greater than 0.1% may cause heritable genetic effects.
- Developmental effects** : No conclusive data is available to indicate product or any component present at greater than 0.1% may cause developmental abnormalities.
- Fertility effects** : No conclusive data is available to indicate product or any component present at greater than 0.1% may impair fertility.
- Medical conditions aggravated by over-exposure** : Pre-existing skin and digestive disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
Copper(II) methanesulfonate	54253-62-2	20-30
Methanesulfonic acid	75-75-2	5-10

Any ingredient not listed in Section 3 is non-regulated or present in the product in concentrations below legal disclosure limits.

4. First aid measures

- Eye contact** : Get medical attention immediately. Chemical burns must be treated promptly by a physician. Check for and remove any contact lenses. Immediately flush eyes with running water for at least 60 minutes, keeping eyelids open. Provide a readily-accessible eyewash facility and quick-drench safety shower.
- Skin contact** : Get medical attention immediately. In case of contact, immediately flush skin with plenty of water for at least 60 minutes while removing contaminated clothing and shoes. Provide a readily-accessible eyewash facility and quick-drench safety shower. Chemical burns must be treated promptly by a physician. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Clean shoes thoroughly before reuse.

Continued on next page

4 . First aid measures

- Inhalation** : Get medical attention immediately. Chemical burns must be treated promptly by a physician. Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. Move affected person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs.
- Ingestion** : Get medical attention immediately. Chemical burns must be treated promptly by a physician. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.
- 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, gloves and eye/face protection. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

5 . Fire-fighting measures

- Flammability of the product** : In a fire or if heated, a pressure increase will occur and the container may burst. Reacts violently when water is added to this product.
- 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 combustion products** : carbon oxides
sulfur oxides
metal oxide/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. Do not breathe 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).

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). The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide. 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.
- 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.

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. Do not get in eyes or on skin or clothing. Provide a readily-accessible eyewash facility and quick-drench safety shower. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or approved alternative container. Containers should be kept closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. Always add acids to water and basic solutions slowly and cautiously. Never add water to acids. The extreme heat generated can cause a violent reaction.
- Storage** : 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. Separate from alkalis. Separate from oxidizing materials. 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. Avoid contamination by any source including metals, dust and organic materials. Provide a readily-accessible eyewash facility and quick-drench safety shower. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store below the following temperature: -12.778°C (9°F).

8 . Exposure controls/personal protection

Product name

Copper(II) methanesulfonate

Exposure limits

OSHA PEL (United States, 2/2006).

TWA: 1 mg/m³ 8 hour(s).

ACGIH TLV (United States, 2/2006).

TWA: 1 mg/m³ 8 hour(s).

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. Provide a readily-accessible eyewash facility and quick-drench safety shower. Processes should be designed to minimize airborne and skin exposure to hazardous substances.

Continued on next page

8 . Exposure controls/personal protection

- 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. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Remove/Take off immediately all contaminated clothing. Contaminated work clothing should not be allowed out of the workplace.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with NIOSH 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. The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment.
- Eyes** : Avoid contact with eyes. Safety eyewear should be used when there is a likelihood of exposure. Direct contact with the eyes can cause irreversible damage, including blindness. Use safety eyewear designed to protect against splash of liquids.
- Skin** : Avoid contact with skin and clothing. Wear protective clothing. Body garments used should be based upon the task being performed (e.g., lab coat, chemical resistant protective suit, sleevelets, synthetic apron, gauntlets) to avoid exposed skin surfaces. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- 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.
- Flash point** : Closed cup: Not applicable.
- Auto-ignition temperature** : Not applicable.
- Flammable limits** : Not available.
- Color** : Blue.
- Odor** : None.
- pH** : <1
- Boiling/condensation point** : 105°C (221°F)
- Melting/freezing point** : -12.778°C (9°F)
- Relative density** : 1.21
- Vapor pressure** : 2.3 kPa (17.5 mm Hg)
- Vapor density** : Not available.
- Odor threshold** : Not applicable.
- Evaporation rate** : 1 (butyl acetate = 1)
- VOC** : 0 g/l
- Solubility** : Easily soluble in the following materials: cold water and hot water.

Continued on next page

10 . Stability and reactivity

- Stability** : The product is stable.
- Conditions to avoid** : No specific data.
- Incompatibility with various substances** : Extremely reactive or incompatible with alkalis.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanesulfonic acid	LC50 Inhalation Vapor	Rat	>330 ppm	6 hours
	LD50 Dermal	Guinea pig	>2000 mg/kg	-
	LD50 Oral	Rat	200 mg/kg	-

Enthone has not conducted specific studies on the toxicity of this product.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Methanesulfonic acid	Acute EC50 1.7 mg/L	Daphnia	24 hours
	Acute LC50 >770 mg/L	Fish	96 hours


13 . Disposal considerations

- Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. 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. 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.

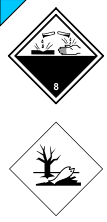

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG* Label	Additional information
DOT Classification	UN3265	CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (COPPER METHANE SULFONATE/ALKYL SULFONIC ACID)	8	II 	ERG# 153

Continued on next page

14 . Transport information

<p>IMDG Class</p>	<p>UN3265</p>	<p>CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (COPPER METHANE SULFONATE/ALKYL SULFONIC ACID). Marine pollutant (Copper(II) methanesulfonate)</p>	<p>8</p>	
<p>UN Class</p>	<p>UN3265</p>	<p>CORROSIVE LIQUIDS, ACIDIC, ORGANIC, N.O.S. (COPPER METHANE SULFONATE/ALKYL SULFONIC ACID)</p>	<p>8</p>	

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Toxic material
Corrosive material
Target organ effects

U.S. Federal regulations : **TSCA 5(a)2 proposed significant new use rules:** No products were found.
TSCA 5(a)2 final significant new use rules: No products were found.
TSCA 12(b) one-time export: No products were found.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class E: Corrosive material

Canada inventory : At least one component is not listed in DSL but all such components are listed in NDSL.

International lists

China inventory (IECSC) : Not determined.

Europe inventory : All components are listed or exempted.

Australia inventory (AICS) : Not determined.

Japan inventory (ENCS) : Not determined.

Korea inventory (KECI) : Not determined.

Philippines inventory (PICCS) : Not determined.

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
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.

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