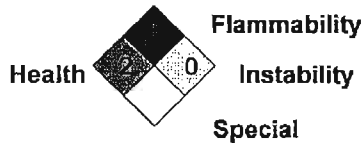


enthone

Material Safety
Data Sheet

Material Safety Data Sheet

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



Health	2
Flammability	0
Instability	0
Physical Hazards	0
Personal protection	

1. Product and company identification

Product name : MICROFAB® NI-100 MAKE-UP
Product Code : 207892
Material uses : Specialty chemicals for the electronics and surface finishing industries.
Manufacturer : Enthone Inc
Enthone OMI de Mexico 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 : 4/24/2010. **Supersedes Date** : 3/31/2010.
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 : **WARNING!**
This product contains material(s) that are absorbed through the skin. Toxic if swallowed. Harmful in contact with skin. Irritating to eyes, respiratory system and skin. May cause sensitization by skin contact. 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. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry : Inhalation. Ingestion.
Potential acute health effects
Inhalation : Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure. The exposed person may need to be kept under medical surveillance for 48 hours.
Ingestion : Toxic if swallowed. Can cause target organ damage. Ingestion may cause gastrointestinal irritation and diarrhea.

Continued on next page

2. Hazards identification

- Skin** : Irritating to skin. 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. May cause sensitization by skin contact. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering. Prolonged or repeated contact may cause dermatitis. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. In the event of any complaints or symptoms, avoid further exposure. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used.
- Eyes** : Irritating to eyes. Adverse symptoms may include the following: redness, itching, swelling, pain
- Potential chronic health effects**
- Chronic effects** : Contains material that can cause target organ damage. Adverse symptoms may include the following:
- Nickel Compound**: Sensitivity to nickel may cause skin irritation ("nickel itch"). May cause discoloration of: eyes.
Boric acid (H3BO3): Other adverse effects: skin rash or hives, blood pressure reduction, cyanosis, weight loss, death.
Nickel Salt: Sensitivity to nickel may cause skin irritation ("nickel itch"). Can produce delayed pulmonary edema
- Target organs** : Contains material which may cause damage to the following organs: blood, kidneys, lungs, the reproductive system, liver, heart, upper respiratory tract, skin, central nervous system (CNS), nose/sinuses.
- Carcinogenicity** : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
- 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.
- California Prop. 65** : **WARNING:** This product contains a chemical known to the State of California to cause cancer.
- 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. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used.

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
Nickel Compound	-	20-30
Boric acid (H3BO3)	10043-35-3	1-5
Nickel Salt	-	0.1-1.0

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

Continued on next page

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Get medical attention if irritation occurs. Immediately flush eyes with running water for at least 30 minutes, keeping eyelids open.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 15 minutes. Get medical attention. May cause sensitization by skin contact. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels. Wash contaminated clothing before reuse. Clean shoes thoroughly before reuse. In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Inhalation** : Get medical attention immediately. 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. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Ingestion** : Get medical attention immediately. 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.
- 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** : nitrogen 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.

Continued on next page

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).
- 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). 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. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. 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.
- 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. 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.
Keep container tightly closed. Keep container in a cool, well-ventilated area.

8. Exposure controls/personal protection

Product name

Nickel Compound

Exposure limits

OSHA PEL 1989 (United States, 1989). Notes: As Nickel

TWA: 1 mg/m³ 8 hour(s).

ACGIH TLV (United States, 2005). Notes: As Nickel

TWA: 0.1 mg/m³ 8 hour(s). Form: Soluble

ACGIH TLV (United States, 1/2008). Notes: as Ni

TWA: 0.1 mg/m³, (as Ni) 8 hour(s). Form: Soluble

OSHA PEL 1989 (United States, 3/1989). Notes: as Ni

TWA: 0.1 mg/m³, (as Ni) 8 hour(s). Form: Soluble

NIOSH REL (United States, 6/2008). Notes: as Ni

TWA: 0.015 mg/m³, (as Ni) 10 hour(s).

OSHA PEL (United States, 11/2006). Notes: as Ni

TWA: 1 mg/m³, (as Ni) 8 hour(s).

Boric acid (H3BO3)

ACGIH TLV (United States, 1/2008). Notes: Refers to Appendix A -- Carcinogens. Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM-TLVs) for those materials that are hazardous when deposited anywhere in the respiratory

Continued on next page

8 . Exposure controls/personal protection

Nickel Salt

tract. ACGIH 2005 Adoption

STEL: 6 mg/m³ 15 minute(s).

TWA: 2 mg/m³ 8 hour(s).

NIOSH REL (United States, 2001). Notes: As Nickel

TWA: 0.015 mg/m³ 10 hour(s).

ACGIH TLV (United States, 2003). Notes: As Nickel

TWA: 1.5 mg/m³ 8 hour(s). Form: Metallic form

ACGIH TLV (United States, 8/2005). Notes: As Nickel

TWA: 0.1 mg/m³ 8 hour(s). Form: Soluble Nickel

OSHA PEL (United States, 1993). Notes: As Nickel

TWA: 1 mg/m³ 8 hour(s).

OSHA PEL 1989 (United States, 1989). Notes: As Nickel

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. Processes should be designed to minimize airborne and skin exposure to hazardous substances.

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. 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.

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9. Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: >93.333°C (>200°F)
Auto-ignition temperature	: Not available.
Flammable limits	: Not available.
Color	: Green.
Odor	: None.
pH	: 2.5 to 4.5
Boiling/condensation point	: 97.778°C (208°F)
Melting/freezing point	: -5°C (23°F)
Relative density	: 1.25
Vapor pressure	: Not available.
Vapor density	: Not available.
Odor threshold	: Not available.
Evaporation rate	: Not available.
VOC	: 0 g/l
Solubility	: Easily soluble in the following materials: cold water and hot water.

10. Stability and reactivity

Stability	: The product is stable.
Conditions to avoid	: No specific data.
Incompatibility with various substances	: Reactive with alkalis.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Other Hazardous decomposition products	: sulfur oxides (SO ₂ , SO ₃ etc.), nitrogen oxides (NO, NO ₂ etc.)
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
Nickel Compound	LDLo Oral	Mouse	250 mg/kg	-
Boric acid (H3BO3)	LD50 Oral	Mouse	3450 mg/kg	-
	LD50 Oral	Rat	2500 mg/kg	-
	LD50 Oral	Rat	2660 mg/kg	-
	LDLo Dermal	Child	1500 mg/kg	-
	LDLo Dermal	Infant	1200 mg/kg	-
	LDLo Dermal	Man	2430 mg/kg	-
	LDLo Oral	Human	214.28 mg/kg	-
	LDLo Oral	Rat	3000 mg/kg	-
	LDLo Oral	Woman	200 mg/kg	-

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Nickel Compound	A4	1	-	+	-	-
Boric acid (H3BO3)	A4	-	-	-	-	-
Nickel Salt	-	1	-	+	Proven.	-

Reproductive toxicity

Continued on next page

11. Toxicological information

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Boric acid (H3BO3)	-	-	Equivocal	Rat - Female	Oral: 1600 mg/kg	-
	-	Equivocal	-	Rat - Male	Oral: 45 g/kg	-

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

12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Boric acid (H3BO3)	Acute EC50 133 to 153 ppm Fresh water	Daphnia - Daphnia magna - <24 hours	48 hours
	Acute LC50 89.07 to 100.7 mg/L Marine water	Crustaceans - Americamysis bahia - Juvenile (Fledgling, Hatchling, Weanling) - <24 hours	48 hours
	Acute LC50 50 to 100 ppm Fresh water	Fish - Oncorhynchus mykiss	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	Not regulated.	-	-	-	

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Toxic material
Irritating material
Sensitizing material
Carcinogen
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.

Continued on next page

15. Regulatory information

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Nickel Compound	-	-
Supplier notification	Nickel Compound	-	-

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Canada

- WHMIS (Canada)** : Class D-2A: Material causing other toxic effects (Very toxic).
Canada inventory : At least one component is not listed in DSL but all such components are listed in NDSL.

International lists

- China inventory (IECSC)** : At least one component is not listed.
Europe inventory : All components are listed or exempted.
Australia inventory (AICS) : All components are listed or exempted.
Japan inventory (ENCS) : All components are listed or exempted.
Korea inventory (KECI) : All components are listed or exempted.
Philippines inventory (PICCS) : All components are listed or exempted.

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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16 . Other information



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