Material Safety Data Sheet

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Revision Date: May 1, 2001

Product Name:	Plating Solution, Nickel
Product Number:	1oz: 115-3831 4oz: 115-3834

DISTRIBUTOR:

Circuit Technology Center
45 Research Drive, Haverhill, MA 01832-1293
Phone: 978-374-5000, FAX: 978-372-5700

Emergency Response 24-Hour Telephone: CHEMTREC United States: (800) 424-9300
International: (703) 527-3887 (collect)

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Section 2. COMPOSITION, INFORMATION OR INGREDIENTS

CHEMICAL	RTECS #	C.A.S. #	Weight %
Nickel Sulfate	QR9600000	7786-81-4	7-13
Formic Acid	LQ4900000	64-18-6	5-10
Ammonium Hydroxide	BQ9625000	1336-21-6	1-5
Citric Acid	GE7350000	77-92-9	1-5
Water	ZC0110000	7732-18-5	67-86

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):

Exposure Limits 8 Hours TWA (PPM)

	OSHA PEL	ACGIH TLV	ACGIH STEL	NIOSH REL	NIOSH IDLH
Nickel Sulfate	1mg/M3	0.1mg/M3	NA	0.015mg/M3	10mg/M3
Formic Acid	9mg/M3 (5ppm)	9.4mg/M3 (5ppm)	19mg/M3 (10ppm)	9mg/M3 (5ppm)	NA
Ammonium Hydroxide	35mg/M3 (50ppm)	17mg/M3 (25ppm)	24mg/M3 (35ppm)	18mg/M3 (25ppm)	- (300ppm)
Citric Acid	NA	NA	NA	NA	NA
Water	NA	NA	NA	NA	NA

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Section 3. HAZARD IDENTIFICATION

Emergency Overview: Dark blue-green liquid with ammonia odor. **Warning!** Irritating to skin, eyes and respiratory system. May cause allergic skin reaction. Cancer hazard. Environmental hazard.

Potential Health Effects:

INHALATION:	Vapor or mist may be harmful if inhaled. May cause sneezing, nasal discharge, coughing, headaches, dizziness, nausea, fatigue or difficulty in breathing. Irritating to the eyes, nose, throat and lungs.
EYES:	May cause eye irritation.
SKIN:	May causes skin irritation. May cause skin sensitization, and allergic reaction (Nickel rash).
INGESTION:	Harmful if swallowed. Can irritate mouth, throat and stomach. May cause liver damage with jaundice, kidney and gastrointestinal damage.
NOTE 1:	Prolonged or repeated exposure may cause damage to skin, eyes, respiratory system and teeth. May cause severe and delayed health effects such as inflammation of the lungs and chemical bronchitis. Prolonged exposure to nickel and nickel compounds may increase the possibility of nasal sinus and lung cancer.
NOTE 2:	Medical conditions generally aggravated by exposure include preexisting skin and eye conditions, respiratory system disorders and preexisting sensitization to nickel.
Target Organs:	Skin, eyes, nasal cavity, lungs, kidney and liver.
Routes of entry:	Skin/eye contact, inhalation and ingestion.

All of the ingredients in this product are listed by IARC, NTP, ACGIH and OSHA as carcinogenic.

Section 4. FIRST AID MEASURES

INHALATION: Remove to fresh air. Lay victim down, legs raised. Loosen tight clothing, cover with a blanket. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
EYE CONTACT: Hold eyelids apart and flush with plenty of water for at least 15 minutes.
SKIN CONTACT: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Thoroughly decontaminate (or discard) clothing and shoes.
INGESTION: DO NOT induce vomiting, unless advised by EMS. Give victim large quantities of water or milk. Give emollients, such as cooking oil or fresh eggs. Never give anything by mouth to an unconscious person.

First aid providers must take proper precautions for their own safety before entering contaminated areas to assist chemical accident victims and handling their contaminated clothing and equipment. Another person should immediately call the Emergency Medical Service, 911-Operator, Hospital, Physician, Ophthalmologist or Poison Control Center, as applicable. Give the following information: Location of the accident, your phone number, description of the accident, name of the chemical agent and product, number and condition of casualties and what is being done for the victims. Stay on the phone until the other party hangs up! Remove victim from contaminated area to a clean, quiet, ventilated area. Calm and reassure him, keep him warm.

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Section 5. FIRE-FIGHTING MEASURES

Flash Point & Method: None
Flammable Limits: LEL: None UEL: None
Autoignition Temperature: NA
GENERAL HAZARD: Containers can build up pressure and burst if exposed to heat (fire). Water runoff can cause environmental damage. Dike area for later disposal.
FIRE FIGHTING INSTRUCTIONS: NIOSH/MSHA approved positive-pressure self-contained breathing apparatus. Structural fire fighters' protective clothing may not provide adequate protection.
HAZARDOUS COMBUSTION PROD.: NA
FLAMMABLE PROPERTIES: Material will not burn.
EXTINGUISHING MEDIA: All

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Section 6. ACCIDENTAL RELEASE MEASURES

LAND SPILL: Do not touch or walk through spilled material. Isolate hazard area and keep people away. Notify your facility emergency coordinator. Eliminate all sources of ignition. Provide maximum ventilation. Do not release into soil, sewers or natural bodies of water. Wear proper personal protective equipment (PPE). Carefully mop up or vacuum spill and triple rinse with water into suitable plastic container. Release of a reportable quantity (RQ) requires notification of proper authorities. Dispose of according to local, state, and federal regulations.

NEUTRALIZING AGENT: None

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Section 7. HANDLING AND STORAGE

STORAGE TEMPERATURE: 60-90°F
STORAGE PRESSURE: Atmospheric
HANDLING: Use "buddy system" when working with chemicals. Do not get in eyes, on skin or on clothing. Do not breathe vapor, mist or gas. Use with adequate ventilation. Wash thoroughly after handling. Triple rinse container clean before discarding. Put nothing else in this container.
STORAGE: Keep container tightly closed in upright position. Store at 60-90°F away from incompatible materials and physical hazards. Do not remove or deface container labels.

Section 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls:
(X) Local Exhaust ventilation is required.
( ) Mechanical ventilation recommended.
( ) Use explosion proof ventilation equipment.
( ) Do not use in confined spaces without mechanical ventilation equipment.
See section 2 for component exposure guidelines.

Personal Protection:

RESPIRATOR:	If engineering controls are not feasible, the respiratory protection program must comply with OSHA's 29 CFR 1910.134, 30 CFR 11 and ANSI Z88.2 requirements.
HAND PROTECTION:	(X) Protective Gloves Recommended (use one of the following) (X) Nitrile (X) Neoprene (X) Vinyl (X) Latex
EYE PROTECTION:	(Use one of the following) (X) Face Shield and Safety Glasses w/Side Shields (X) Chemical Goggles (splash-proof) **Note 1: DO NOT WEAR CONTACT LENSES**
OTHER RECOMMEND.:	(Use all of the following) (X) Eye Bath (X) Safety Shower (X) Washing Station nearby (X) Impervious Boots (X) Apron (X) Approp. Protective Clothing

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Density	1.122-1.126 g/ml	pH	7.5-7.9
Boiling Point	>100°C, >212°F	% Volatile By Volume	NA
Freezing Point	<0°C, <32°F	% Solids	NA
Vapor Density (Air = 1)	NA	Evaporation Rate (Ethyl Ether = 1)	<1
Solubility in Water	Complete	Viscosity	NA
Molecular Weight	NA	Physical State	Liquid
Non-Exempt VOC (g/L)	NA	Odor	Ammonia
Appearance: Blue-green liquid.		Vapor Pressure	NA

Section 10. STABILITY AND REACTIVITY

GENERAL:	Stable under normal ambient conditions.
INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:	Strong bases, strong acids, and oxidizers.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS:	SO_X, Ni, CH_2O_2, NH_3.
HAZARDOUS POLYMERIZATION:	Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

RESULTS OF COMPONENT TOXICITY TEST PERFORMED:	Information not available.
HUMAN EXPERIENCE:	Information not available.

Section 12. ECOLOGICAL INFORMATION

FURTHER INFORMATION: Information not available.

Section 13. DISPOSAL CONSIDERATIONS

RCRA 40 CFR 261 Classification:

Federal, State, and Local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

EPA Waste I.D. Number: None

WASTE DISPOSAL METHOD: Follow the applicable regulations for disposal of empty containers and rinsate. The disposal information applies to the materials as manufactured. Contamination may affect the disposal requirements. The responsibility for proper waste disposal is with the generator of the waste.

Section 14. TRANSPORT INFORMATION

DOT, IATA, ICAO, and IMO Description:

Basic Description:	NA
Proper Shipping Name:	Nickel (Neutral) Plating Solution Code SPS 5650
Hazard Class:	Not regulated by DOT*
Packaging Group:	None
UN Number:	None
Label Requirements:	None
Max. Shippable Qty.:	1 liter, 4 liter Polyethylene Bottle
Packaging:	Meets Performance Oriented Packaging Requirements
Reportable Quantity (RQ):	NA
1996 NAERG Guide#:	NA
Limitations:	NA

* Per 49 CFR Ch.I (10-1-94 Edition), 171.8, *Hazardous substance* paragraph, subparagraph (1), (2), (3), (ii) and Appendix A to 172.101, can be shipped as a Nonhazardous substance.

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Section 15. REGULATORY INFORMATION

UNITED STATES FEDERAL REGULATIONS:

MSDS complies with OSHA's Hazard Communication Rule, 29 CFR 1910.1200.

CERCLA/SUPERFUND, 40 CFR 117, 302:
--- None of the chemicals are Superfund hazards ---

SARA SUPERFUND AND REAUTHORIZATION ACT OF 1986 TITLE III Sections 302, 311, 312 and 313:

Section 302 - Extremely hazardous substances (40 CFR 355)
--- None of the chemicals are Section 302 hazards ---

Section 311/312 - Material Safety Data Sheet Requirements (40 CFR 370)

- ( ) By our hazard evaluation, this product is non-hazardous
- (X) By our hazard evaluation, this product is hazardous. It should be reported under the following EPA hazard:
  - (X) Immediate (acute) health hazard
  - (X) Delayed (chronic) chronic health hazard
  - ( ) Sudden release of pressure hazard
  - ( ) Reactive Hazard

Section 313 - List of Toxic Chemicals (40 CFC 372)

This product contains the following chemicals (at levels of 1% or greater) which are found on the 313 list of Toxic Chemicals

Toxic Chemical	**C.A.S. Number**	**Weight %**
Nickel Compound, as Ni	7440-02-0	7
Formic Acid	64-18-6	10

TOXIC SUBSTANCE CONTROL ACT (TSCA): All substances are TSCA Listed.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA 40 CFR 261) Subpart C&D:
Refer to Section 11. for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (FORMERLY SECTION 307), 40 CFR 116 (FORMERLY SECTION 311)
This product contains the following chemicals which are listed:

CHEMICAL	C.A.S. Number	Weight %

CLEAN AIR ACT: --- No Information ---

CERCLA and EPCRA:

Threshold Planning Quantity:	NA
(Release) Reportable Quantity:	>370 liters
Extremely Hazardous Substance:	NO

EPCRA Hazard Categories:

Immediate (Acute) Health:	YES
Delayed (Chronic) Health:	YES
Fire:	NO
Sudden Release of Pressure:	NO
Reactivity:	NO

ODS Certification:
This product does not contain and is not manufactured with Ozone Depleting Substances (ODS).

VOC Certification:
This product does not contain any Volatile Organic Compounds (VOC).

PCB Certification:
This product does not contain any polychlorinated biphenyls (PCB).

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:

WARNING! This product contains detectable amounts of chemicals known to the State of California to cause cancer, birth defects, or reproductive toxicity.

INTERNATIONAL REGULATIONS:

CANADA WHIMS:	Class D-2A
EUROPE EINECS NUMBERS:	NA

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Section 16. OTHER INFORMATION

LABEL INFORMATION:

European risk and Safety Phrases:	NA
European Symbols Needed:	NA
Canadian WHIMS Symbols:	NA

NFPA HAZARD RATING:

(0) Flammability (2) Health (0) Reactivity

REVISION DATES, SECTIONS, REVISED BY:
08-OCTOBER-98, J. FORBES

ABBREVIATIONS USED IN THIS DOCUMENT:
NE - Not Established, NA - Not Applicable/Not Available, NIF - No Information Found

REFERENCES:
Code of Federal Regulations (CFR)
The Sigma-Aldrich Library of Regulatory and Safety Data
Chemical Guide and OSHA Hazard Communication Standard
Various Federal, State & Local Regulation

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