LIQUID TIN **421-LIQUID**

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: Liquid Tin

SDS Code: 421-Liquid

Related Part # 421-125ML, 421-500ML

Recommended Use and Restriction on Use

Use: Electroless tin plating solution

Uses Advised Against: Not available

Details of Manufacturer or Importer

Manufacturer
MG Chemicals
1210 Corporate Drive
Burlington, Ontario L7L 5R6
CANADA

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FAX +1-800-340-0773
E-MAIL support@mgchemicals.com
WEB www.mgchemicals.com

MG Chemicals (Head Office)
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Surrey, British Columbia V4N 4E7
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☎ +1-905-331-1396
FAX +1-905-331-2682
E-MAIL info@mgchemicals.com

E-MAIL (Competent Person): sds@mgchemicals.com

Emergency Phone Number

For hazardous material incidents ONLY—leaks, spills, fires, exposures or accidents
USA or CANADA: Call CHEMTREC ☎: ***+1-800-424-9300***

For emergencies involving dangerous goods—Collect 24/7
CANADA: Call CANUTEC ☎: ***+1-613-996-6666*** or ****666*** on cellular phones

Section 2: Hazards Identification

Classification of Hazardous Chemical

GHS Categories

Criteria		Category	Signal Word	Pictograms
Eye Damage		1	Danger	Corrosion
Skin Corrosion		1	Danger	Corrosion
Corrosive to Metals		1	Warning	Corrosion
Reproductive Toxicity		2	Warning	Health
Carcinogenicity		2	Warning	Health
Sensitization	Skin	1	Warning	Exclamation
Acute Toxicity	Oral	4	Warning	Exclamation

Note: The degree of severity is ranked within each hazard class from 1 (Highest Severity) to up to 5 (Lowest Severity), which is opposite to HMIS and NFPA conventions. Severity category rankings do not allow comparisons between classes.

Label Elements

Signal Word	**DANGER**
Pictograms	**Hazard Statements**
	H314: Causes severe skin burns and eye damage H290: May be corrosive to metals
	H361: Suspected of damaging fertility or the unborn child H351: Suspected of causing cancer
	H317: May cause an allergic skin reaction H302: Harmful if swallowed

Section continued on the next page

Continued…

Prevention	**Precautionary Statements**
P102	Keep out of reach of children.
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe spray or mists.
P280	Wear protective gloves/eye protection/face protection.
P264	Wash hands thoroughly after handling.
P234	Keep only in original packaging.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing should not be allowed out of the workplace.
Response	**Precautionary Statements**
P310	For all routes of exposure: Immediately call a POISON CENTRE/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303 + P361 + 352	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Wash with plenty of water or shower.
P333 + P313	If skin irritation or rash occurs: Get medical attention.
P363	Wash contaminated cloathing before reuse.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P390	Absorb spillage to prevent material damage.
Storage	**Precautionary Statements**
P405	Store locked up.
P406	Store in corrosion resistant container with a resistant inner liner.
Disposal	**Precautionary Statements**
P501	Dispose of contents/container in accordance to local/regional/international regulations.

Section continued on the next page

Hazards Not Otherwise Specified

Not applicable

Section 3: Composition/Information on Ingredients

CAS #	Chemical Name	%(weight)
16872-11-0	fluoroboric acid	9–11%
13814-97-6	tin fluoroborate	9–11%
62-56-6	thiourea	4–6%

Note: aqueous solution

Section 4: First-Aid Measures

Exposure Condition	*GHS Code/Symptoms/Precautionary Statements*
IF IN EYES	P305 + P351 + P338, P310
Immediate Symptoms	*redness, pain, severe irritations/burns*
Response	Rinse cautiously with water for at least 60 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTRE/doctor.
IF ON SKIN (or hair)	P303 + P361 + P352, P310, P333 + P313, P363
Immediate Symptoms	*redness, rash, pain, severed irritation/burns, blisters*
Delayed Symptoms	*chemical burn*
Response	Take off immediately contaminated clothing. Wash with plenty of water or shower. Immediately call a POISON CENTRE/doctor. If skin irritation or rash occurs; or if exposed or concerned: Get medical advice/attention. Wash contaminated cloathing before reuse.
IF INHALED	P304 + P340, P310, P333 + P313
Immediate Symptoms	*cough, irritation of the respiratory track, burning sensation in throat and chest*
Delayed Symptoms	*chemical burn*
Response	Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTRE/doctor. If exposed or concerned: Get medical advice/attention.

Section continued on the next page

IF SWALLOWED	P301 + P330 + P331, P310, P308 + P313
Immediate Symptoms	*mouth burns, burning sensation in throat and chest, abdominal pain, nausea, vomiting, shock*
Response	Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTRE/doctor. If exposed or concerned: Get medical advice/attention.

Section 5: Fire Fighting Measures

Extinguishing Media	In case of fire: Use extinguish media suitable for surrounding.
Specific Hazards	Will not burn. In a fire, this product can release toxic fumes and gases.
Combustion Products	Produces CO and CO_2, boron oxides, boron trifluorides, sulfur oxides (SO_x), hydrogen fluoride (HF), stannous fluoroborate
Fire-Fighter	Wear self-contained breathing apparatus and full fire-fighting turn-out gear.

Section 6: Accidental Release Measures

Personal Protection	Use personal protection recommended in Section 8.
Precautions for Response	Do not breathe mist/spray. Ensure adequate ventilation. Remove all sources of extreme heat.
Environmental Precautions	Prevent spill from entering drains and waterways.
Containment Methods	Contain with inert absorbent (such as soil, sand, vermiculite).
Cleaning Methods	Sprinkle inert absorbent compound (sand, diatomite, acid binders, universal binders) onto spill, then sweep into a corrosion resistant (plastic) waste container. Wash spill area with soap and water to remove the last traces of residue.
Disposal Methods	Dispose of spill waste according to Section 13.

Section 7: Handling and Storage

Prevention

Keep out of reach of children.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Do not get in eye, on skin, or on clothing.

Do not breathe mist/spray.

Do not eat, drink, or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace.

Handling

Wear protective gloves/clothing/eye protection. Take off immediately all contaminated clothing and wash them before reuse.

Absorb spillage to prevent material damage.

Wash hands thoroughly after handling.

Storage

Store in corrosion resistant container with a resistant inner liner. Keep tightly closed. Do not store together with strong bases, strong oxidizing agents, or foodstuff.

Store locked up.

Section 8: Exposure Controls/Personal Protection

Substances with Occupational Exposure Limit Values

Chemical Name	Country	Long Term Exposure Limits (PEL)	Short Term Exposure Limits (STEL)
tin and its inorganic compounds: *(tin fluoroborate)*	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	2 mg/m^3 2 mg/m^3 2 mg/m^3 2 mg/m^3 2 mg/m^3 2 mg/m^3	Not established Not established Not established Not established Not established Not established

Note: The ACGIH[1], OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from by RTECS[2] database and data from suppliers' SDS were also consulted. Short term exposure limits (STEL) are for 15 min and long term permissible exposure limits (PEL) for 8 h.

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Engineering Controls

Ventilation Keep airborne concentrations below exposure limits.

Personal Protective Equipment

Eye protection Wear appropriate protective eyeglasses or chemical safety goggles.

Recommendation: Ensure that glasses have side shields for lateral protection.

Skin Protection For likely contacts, use of protective gloves in butyl rubber, chloroprene, latex, or other chemically resistant gloves with a minimum thickness of 0.6 mm.

For incidental contacts, use disposable nitrile with a minimum thickness ≥ 0.1 mm, or other chemically resistant gloves.

Respiratory Protection If exposed to mist or fumes above the exposure limit, wear a suitable respirator meeting local/regional/national guidelines.

RECOMMENDATION: Consult your local safety supply store to ensure that your respirator has a NIOSH (U.S.) approved filter cartridges appropriate for the ingredients listed in Section 3. The respirator should be fitted to the employee by a professional.

General Hygiene Considerations

Wash hands thoroughly with water and soap after handling.

Section 9: Physical and Chemical Properties

Physical State	Liquid	**Lower Flammability Limit**	Not available
Appearance	Clear	**Upper Flammability Limit**	Not available
Odor	Pungent	**Vapor Pressure @20 °C**	23 hPa [17 mmHg]
Odor Threshold	Not available	**Vapor Density**	Not available
pH	<1	**Specific Gravity @25 °C**	1.12
Freezing/Melting Point	Not available	**Solubility in Water**	Soluble
Boiling Point a)	>100 °C [>212 °F]	**Partition Coefficient**	Not available
Flash Point b)	>93 °C [>200 °F]	**Auto-ignition Temperature**	Not available
Evaporation Rate	Not available	**Decomposition Temperature**	Not available
Flammability (solid, gas)	Not available	**Viscosity @40 °C**	Not availalable

a) Based on water component
b) Value based on minor thiorea organic component

Section 10: Stability and Reactivity

Reactivity	Not available.
Chemical Stability	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Formation of mist or dust, and temperatures above 140 °C [284 °F].
Incompatibilities	Avoid strong bases, strong oxidizing agents, and water incompatible substances like alkali or alkali earth metals.
Polymerization	Will not occur
Decomposition	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5.

Section 11: Toxicological Information

Routes of Exposure

Eye contact, Skin contact, Ingestion, Inhalation

Symptoms Summary

Eyes May cause redness, pain, and severe irritations/burns.

Skin May causes severe skin irritation, allergic skin reaction, pain, chemical burns, and blisters.

Inhalation May cause cough and upper respiratory tract irritation (nose, throat and lung) and burning sensations.

May cause delayed difficulty breathing due to pulmonary adema (excess fluid in lungs).

Overexposure to dust or metal fumes may lead to a pneumoconiosis (or Stannosis).

Ingestion May cause burns to the mouth, esophagus, stomache. May cause nausea, vomiting, and shock.

Chronic Prolonged and repeated exposure may lead to skin sensitization.

Ingestion or inhalation may have reproductive, developmental, and carcinogenic effects.

Acute Toxicity (Lethal Exposure Concentrations)

Chemical Name	LD50 oral	LD50 dermal	LC50 inhalation
fluoroboric acid	100 mg/kg Rat	Not available	Not available
tin fluoroborate	130 mg/kg Rat [a)]	>2 000 mg/kg Rabbit [a)]	Not available
thiourea	>2 000 mg/kg Rat [a)]	>2 000 mg/kg Rabbit [a)]	Not available

Note: Toxicity data from the RTECS[2] and ECHA databases were consulted. The data from supplier (M)SDS were also consulted.

a) Toxicity data reported by ECHA registrants

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Other Toxicological Effects

Skin corrosion/irritation	Causes severe skin burns or irritation.
Serious eye damage/irritation	Causes serious eye damage or irritation.
Sensitization (allergic reactions)	Tin fluoroborate [CAS# 13814-97-6] is a known skin sensitizer.
Carcinogenicity (risk of cancer)	Thiourea is classified as a possible carcinogen based on animal studies and North American regulatory guidelines.
	Thiourea[CAS# 62-56-6]
	IARC Group 2B: Possibly carcinogenic to humans
	ACGIH A3: Confirmed Animal Carcinogen with Unknown Relevance to Humans
	CA Prop 65: Listed as Carninogen
	NTP: Reasonably anticipated to be a human carcinogen
Mutagenicity (risk of heritable genetic effects)	Based on available data, the classification criteria are not met.
Reproductive Toxicity (risk to sex functions)	Thiourea is believed to decrease fertility in males and females based on animal studies.
Teratogenicity (risk of fetus malformation)	Thiourea may presents a developmental hazard based on animal studies.
STOT-single exposure	Based on available data, the classification criteria are not met.
STOT-repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Based on available data, the classification criteria are not met. This product doesn't contain any Cat 1 ingredients.

Section 12: Ecological Information

Ecological classifications are based on the IMDG/GHS criteria in conjunction with ecotoxicological data from our suppliers, the European Chemical Agency database (http://echa.europa.eu), and other reliable sources.

Water, fluoroboric acid, and tin fluoroborate have low ecotoxicty effect or data is not available.

Acute Ecotoxicity

Based on available data, the classification criteria are not met.

Chronic Ecotoxicity

Based on available data, the classification criteria are not met.

Biodegradability

Non biodegrable.

Other Effects

Not available

Section 13: Disposal Considerations

Dispose of contents in accordance with all local, regional, national, and international regulations.

Section 14: Transport Information

Ground

Refer to TDG regulations (Canadian Transportation of Dangerous Goods regulations); **USA DOT 49 CFR** (Parts 100 to 185) **Regulations**.

Sizes 1 L and under	Sizes greater than 1 L
Limited Quantity 	**UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II **Marine Pollutant:** No 

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

Sizes 0.5 L and under	Sizes greater than 0.5 to 1 L
Limited Quantity Max. Net Qty/Pkg 0.5 L  Packing Instr. Y840	**UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II **Marine Pollutant:** No  Packing Instr. 851 (Max Net Qty: 1 L).

NOTE: Do NOT ship cargo since the product will freeze and be damaged below 0 °C.

Sea

Refer to IMDG regulations.

Sizes 1 L and under	Sizes greater than 1 L
Limited Quantity 	**UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II **Marine Pollutant:** No 

Note: **Shipper must be appropriately <u>trained and certified</u> before involvement with the transport of dangerous goods.**

Section 15: Regulatory Information

Canada

Domestic Substance List (DSL) / Non-Domestic Substance Lists (NDSL)

All hazardous ingredients are listed on the DSL/NDSL.

Industry and Science Canada

MG Labels products intended for the workplace to conform to WHMIS labeling regulations. Product identification, net quantity declaration, minimum printing type size heights, and packaging of this product are in compliance.

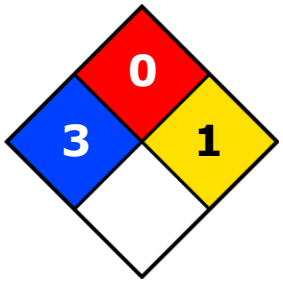
USA

Other Classifications

HMIS® RATING

HEALTH:	* 3
FLAMMABILITY:	0
PHYSICAL HAZARD:	1
PERSONAL PROTECTION:	

NFPA® 704 CODES



Approximate HMIS and NFPA Risk Ratings Legend:
0 (Low or none); 1 (Slight); 2 (Moderate); 3 (Serious); 4 (Severe)

CAA (Clean Air Act, USA)

This product does not contain any class 1 ozone depleting substances.

This product does not contain any class 2 ozone depleting substances.

This product does not contain substances that are listed as hazardous air pollutants.

EPCRA (Emergency Planning and Right to Know Act, USA, 40 CFR 372.45

This product contains thiourea (CAS# 7439-92-1; reportable quantity = 10 lb), which is subject to the reporting requirements of section 313 Title III of the SARA of 1986 and 40 CFR part 372.

TSCA (Toxic Substances Control Act of 1976, USA)

All substances are TSCA listed.

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California Proposition 65 (Chemicals known to cause cancer or reproductive toxicity, Sept 2, 2011 revision, USA).

This product contain thiourea, which is listed as a carcinogen.

Europe

RoHS (Restriction of Hazardous Substances Directive)

This product does not contain any lead, cadmium, mercury, hexavalent chromium, PBB's, or PBDE's, and complies with European RoHS regulations.

WEEE (Waste Electrical and Electronic Equipment Directive)

This product is subject to the WEEE regulation.

Section 16: Other Information

MSDS Prepared by Michel Hachey

Date of Issue 11 April 2016

Supersedes 31 March 2016

Reason for Changes: Revision to Section 9 in compliance with HCS2012 and WHMIS 2015 formats.

Reference

1) ACGIH *2013 TLVs and BEIs: Based on the documentation of the threshold limit values for chemical substances and physical agents & biological exposure indices*, American Conference of Governmental of Industrial Hygienist Cincinnati, OH (2013).

2) All toxicological data were checked against the RTECS (Registry of Toxic Effects of Chemical Substances®)

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Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists (USA)
EC50	Half maximal effective concentration
EL50	Half maximal effective loading
NOELR	No observable effect loading ratio
GHS	Globally Harmonized System of Classification of Labeling of Chemicals
LC50	Lethal Concentration 50%
LCLo	Lowest published lethal concentration
LD50	Lethal Dose 50%
PEL	Permissible Exposure Limit
STEL	Short-Term Exposure Limit
TCLo	Lowest published toxic concentration
TWA	Time Weighted Average
VOC	Volatile Organic Content

Technical Queries Contact us regarding any questions, improvement suggestions, or problems with this product. Application notes, instructions, and FAQs are located at www.mgchemicals.com.

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