421 **LIQUID TIN**

Safety Data Sheet

Section 1: Identification

Product Identifier and Other Means of Identification

Product Name: 421

Other Means of Identification: Liquid Tin

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)
9347-193 Street
Surrey, British Columbia V4N 4E7
CANADA

☎ +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 Verisk 3E at ***+1-866-519-4752*** or ***+1-760-476-3962***
(Service access code: 335388)

For emergencies involving the transport of dangerous goods; 24/7 service
CANADA—Call CANUTEC collect at ***+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
Reproductive Toxicity		2	Warning	Health
Carcinogenicity		2	Warning	Health
Sensitization	Skin	1	Warning	Exclamation
Acute Toxicity	Oral	4	Warning	Exclamation
Hazardous to the Aquatic Environment	Chronic	3	none	none

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
	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

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Pictograms	**Hazard Statements**
No symbol mandatory	H412: Harmful to aquatic life with long lasting effects
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 vapor, spray, or mists.
P280	Wear protective gloves, protective clothing, and eye protection.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
Response	**Precautionary Statements**
P310	For all routes of exposure: Immediately call a POISION CENTER or doctor.
P308 + P313	IF exposed or concerned: Get medical advice or 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 advice or attention.
P363	Wash contaminated clothing 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.

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Storage	**Precautionary Statements**
P405	Store locked up.
Disposal	**Precautionary Statements**
P501	Dispose of contents in accordance to local, regional, national, and international regulations.

Hazards Not Otherwise Specified

Other Criteria	**Hazard Statements/Precautionary Statement**	**Signal Word**	**Pictograms**
None	None	None	None

Section 3: Composition/Information on Ingredients

CAS #	**Chemical Name**	**%(weight)**
16872-11-0	fluoroboric acid	10%
62-56-6	thiourea	10%
13814-97-6	tetrafluoroborate	4%
10043-35-3	boric acid	1%

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 irritation, burns*
Delayed Symptoms	*symptoms may be delayed*
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 or doctor.

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IF ON SKIN (or hair)	P303 + P361 + P352, P310, P333 + P313, P363
Immediate Symptoms	*redness, rash, serious irritation, burns, pain, blisters*
Delayed Symptoms	*symptoms may be delayed*
Response	Take off immediately contaminated clothing. Wash with plenty of water or shower. Immediately call a POISON CENTRE or doctor. If skin irritation or rash occurs: Get medical attention. Wash contaminated clothing before reuse.
IF INHALED	P304 + P340, P310, P333 + P313
Immediate Symptoms	*cough, irritation of the respiratory track, burning sensation in throat, nose and chest*
Delayed Symptoms	*difficulty breathing, shortness of breath*
Response	Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTRE or doctor. If exposed or concerned: Get medical attention.
IF SWALLOWED	P301 + P330 + P331, P310, P308 + P313
Immediate Symptoms	*burns and burning sensation in mouth, throat, esophagus and stomach*
Response	Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTRE or doctor. If exposed or concerned: Get medical attention.

Advice to Physicians

This product contains fluoroboric acid giving rise to fluoride ion exposure. Symptoms may be delayed by up to 24 h after exposure. To minimize skin tissue damage, neutralize with antidotes like calcium gluconate jelly, aqueous hyamine, or zyperihan chloride solutions. To minimize eye damage, treat eyes with a solution of pontocaine hydrochloride. I case of inhalation exposure, it is recommended to put the patient under medical surveillance for 24 to 48 h due to risk of delayed pulmonary edema.

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, vapors. 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 vapor, spray, mists. Do not eat, drink, or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace.

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Handling	Wear protective gloves, protective clothing, eye protection. Take off immediately all contaminated clothing and wash them before reuse. Wash hands thoroughly after handling.
Storage	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
borate compounds, inorganic *(boric acid)*	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	2 mg/m^3 Not established Not established 2 mg/m^3 2 mg/m^3 Not established	6 mg/m^3 Not established Not established 6 mg/m^3 6 mg/m^3 Not established
Fluoroboric acid *(Fluorides, as F)*	ACGIH U.S.A. OSHA PEL Canada AB Canada BC Canada ON Canada QC	2.5 mg/m^3 2.5 mg/m^3 (as dust) 2.5 mg/m^3 2.5 mg/m^3 2.5 mg/m^3 2.5 mg/m^3	Not established Not established Not established Not established Not established Not established

Note: Ingredients are listed in descending weight contribution order (from greatest to least). The ACGIH[1], OSHA (Table Z-1), and Canadian provinces exposure limits were consulted. Limits from the RTECS[2] database and 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 occupational exposure limits (OEL).

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	For over-exposures up to 10 x OEL of mist, vapors, or spray; wear respirator such as a half-mask respirator with organic vapor cartridges. **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. Ensure vapor cartridges are stored in sealed plastic bags when not being used.

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	Water white to light brown	**Upper Flammability Limit**	Not available
Odor	Mild	**Vapor Pressure @20 °C**	Not available
Odor Threshold	Not available	**Vapor Density**	Not available
pH	<1	**Relative Density @25 °C**	1.12
Freezing/Melting Point	Not available	**Solubility in Water**	Soluble
Initial Boiling Point [a)]	>100 °C [>212 °F]	**Partition Coefficient octanol/water**	Not available
Flash Point	Not available	**Auto-ignition Temperature**	Not available
Evaporation Rate	Not available	**Decomposition Temperature**	Not available
Flammability	Not applicable	**Viscosity @40 °C**	Not available

a) Value based on water

Section 10: Stability and Reactivity

Reactivity	May react with alkali metals to form hydrogen gas.
Chemical Stability	Chemically stable at normal temperatures and pressures
Conditions to Avoid	Avoid aersolization and incompatible substances.
Incompatibilities	Avoid strong reducing agents, alkalies, and strong bases.
Polymerization	Will not occur
Decomposition	Will not decompose under normal conditions. For thermal decomposition, see combustion products in Section 5.

Section 11: Toxicological Information

Summary of Effects and Symptoms by Routes of Exposure

Eyes	May cause redness, pain, severe irritation, or burns. The symptoms may be delayed.
Skin	May causes redness, rash, serious irritation, pain, or blisters. The symptoms may be delayed.
Inhalation	May cause cough, upper respiratory tract irritation, burning sensations (nose, throat, and lung). May also cause difficulty breathing and shortness of breath due to respiratory edema (excess of liquid in lungs). The symptoms may be delayed.
Ingestion	May cause burns and burning sensation in mouth, throat, esophagus and stomach.
Chronic	Prolonged and repeated exposure may lead to skin sensitization. The product may have effects on the bones and teeth , resulting in fluorosis. 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
thiourea	>2 000 mg/kg Rat	>2 800 mg/kg Rabbit	Not available
tetrafluoroborate	130 mg/kg Rat	>2 000 mg/kg Rabbit	Not available
boric acid	>2 600 mg/kg Rat	>2 000 mg/kg Rabbit	Not available

Note: Toxicity data from the RTECS[2] and ECHA databases were consulted. The data from supplier SDSs were also consulted.

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Other Toxicological Effects

Skin corrosion/irritation	Causes severe skin burns.
Serious eye damage/irritation	Causes serious eye damage.
Sensitization (allergic reactions)	The tetrafluoroborate 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 Carcinogen
	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 and boric acid are believed to decrease fertility in males and females based on animal studies.
Teratogenicity (risk of fetus malformation)	Thiourea and boric acid may present 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.

Thiourea is an acute category 2 environmental toxicant. It is rapidly biodegradable with minimal LC50 of 10 mg/L 96 h for Danio rerio (zebra fish); EC50 of ≥5.6 mg/L 48 h Daphnia magna (water flea); EC50 of 6.8 mg/L 96 h Desmodesmus subspicatus (green algae).

Based on available data, fluoroboric acid, tetrafluoroborate, sodium hypophosphite, and boric acid are not classified as environmental hazards according to GHS criteria.

Acute Ecotoxicity

See the chronic section.

Chronic Ecotoxicity

Category 3

Harmful to aquatic life with long lasting effects

Avoid release to the environment.

Biodegradability

Not available

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
421-125ML, 421-500ML **Limited Quantity**	*FOR REFERENCE ONLY* **UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II **Marine Pollutant:** No

Air

Refer to ICAO-IATA Dangerous Goods Regulations.

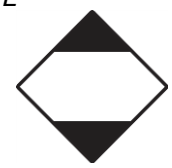
Sizes 0.5 L and under	Sizes greater than 0.5 to 1 L
421-125ML, 421-500ML **Limited Quantity** Max. Net Qty/Pkg 0.5 L Packing Instr. Y840	*FOR REFERENCE ONLY* **UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II Marine Pollutant: No Packing Instr. 851 (Max Net Qty: 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
421-125ML, 421-500ML **Limited Quantity**	*FOR REFERENCE ONLY* **UN number**: UN1775 **Shipping Name:** FLUOROBORIC ACID **Class:** 8 **Packing Group**: II Marine Pollutant: No



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Note: **Shipper must be appropriately trained and certified 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.

Hazardous Products Act (R.S.C., 1985, c. H-3)

The safety data sheet and label comply with the Hazardous Product Act and WHMIS 2015.

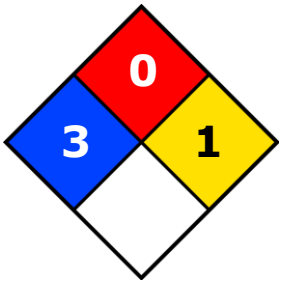
USA

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# 62-56-6; 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).

This product contains 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, PBDE's, DEHP, BBP, DBP, or DIBP and complies with European RoHS regulations.

WEEE (Waste Electrical and Electronic Equipment Directive)

This product is not a piece of electrical or electronics equipment, and is therefore not governed by this regulation.

Section 16: Other Information

SDS Prepared by	Regulatory Department
Date of Review	17 March 2020
Supersedes	03 January 2019
Reason for Changes:	Change to emergency phone numbers.

Reference

1) ACGIH *2017 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 (2017).

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

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

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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.

Email: support@mgchemicals.com

Mailing Addresses

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