



Description

The 421 *Liquid Tin* is a clear immersion tin solution designed to coat copper traces and solder deposits with a thick coating layer of tin. The deposited tin is readily solderable and it extends the work life of circuits by protecting it from corrosion. The excellent corrosion resistance is provided by the pure tin deposit, which is free of co-deposited organics. The 421 ensures good solderability for solder deposits by cleaning them and by making their surface bright and active.

Benefits and Features

- **No dilution required**
- **High tin concentration**
- **Clear solution even at room temperature**
- **Rinsable residues**
- **Very stable solution**

ATTENTION!

Keep at temperature above 5 °C to avoid unwanted precipitations. If the product freezes, the solution will be ruined.

Principal Components

Name	CAS Number
Fluoroboric acid	16872-11-0
Thiourea	62-56-6
Tetrafluoroborate	13814-97-6
Sodium hypophosphite	7681-53-0
Boric acid	10043-35-3

Usage Parameters

Parameters	Value	
Shelf Life from Date of Manufacture (DOM)	2 y	
Storage Temperature Limits	5 to 30 °C [41 to 86 °F]	
Time	5 min	
Deposition Rate	10 µin/min	
Agitation	Constant mechanical	
Properties	Optimal	Range
Activity Range ^{a)}	100%	10 to 120%
Constant Service Temperature	27 °C [81 °F]	21 to 60 °C [70 to 140 °F]

a) May be used until activity drops to approximately 10%. Volume lost due to evaporation can be replaced with deionized (DI) water. Chemical replenishment is not recommended.

421 Properties

<i>Physical Property</i>	<i>Value</i>
Color	Clear, light yellow
Odor	Pungent
Viscosity @40 °C [104 °F]	≤20.5 mm ² /s
Density @25 °C [77 °F]	1.12 g/mL
Flash Point	>100 °C [>212 °F]
Boiling Point	100 °C [212 °F]
Melting Point	176 °C [349 °F]
pH	<1
Vapor Pressure @20 °C [68 °F]	2 446 hPa

Figure 1. Tin deposition with respect to time and ambient to warm temperatures

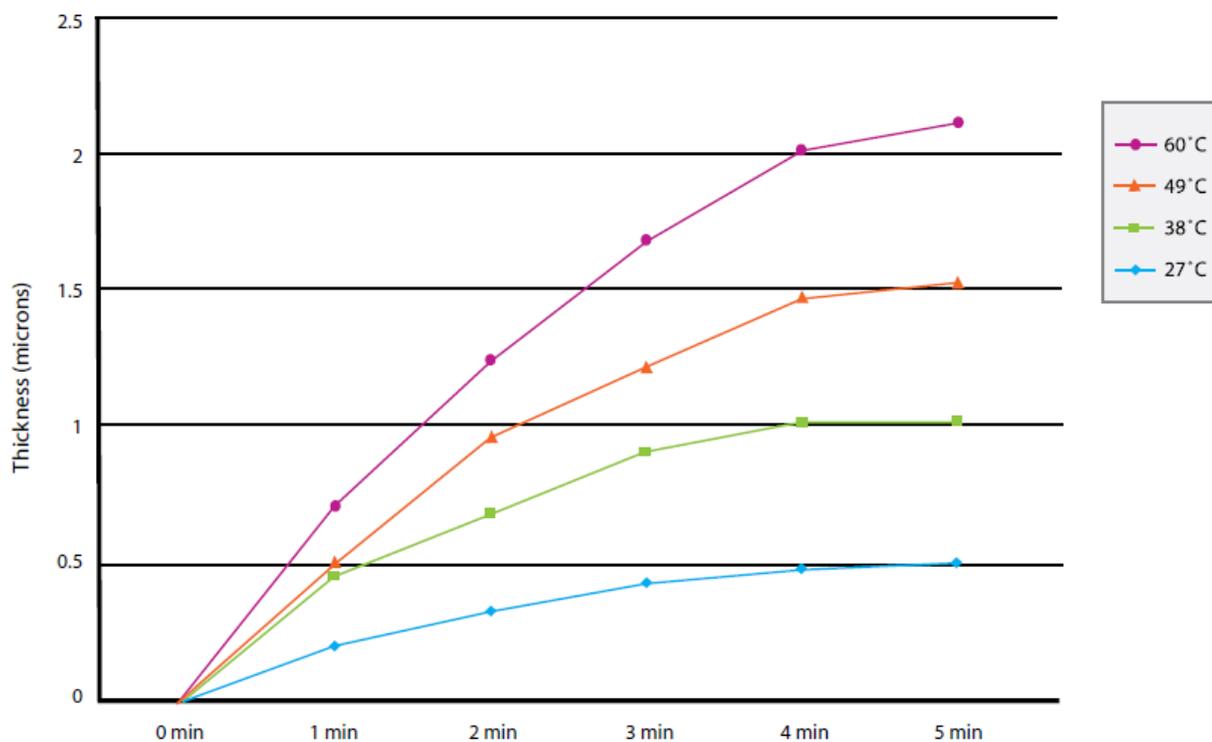
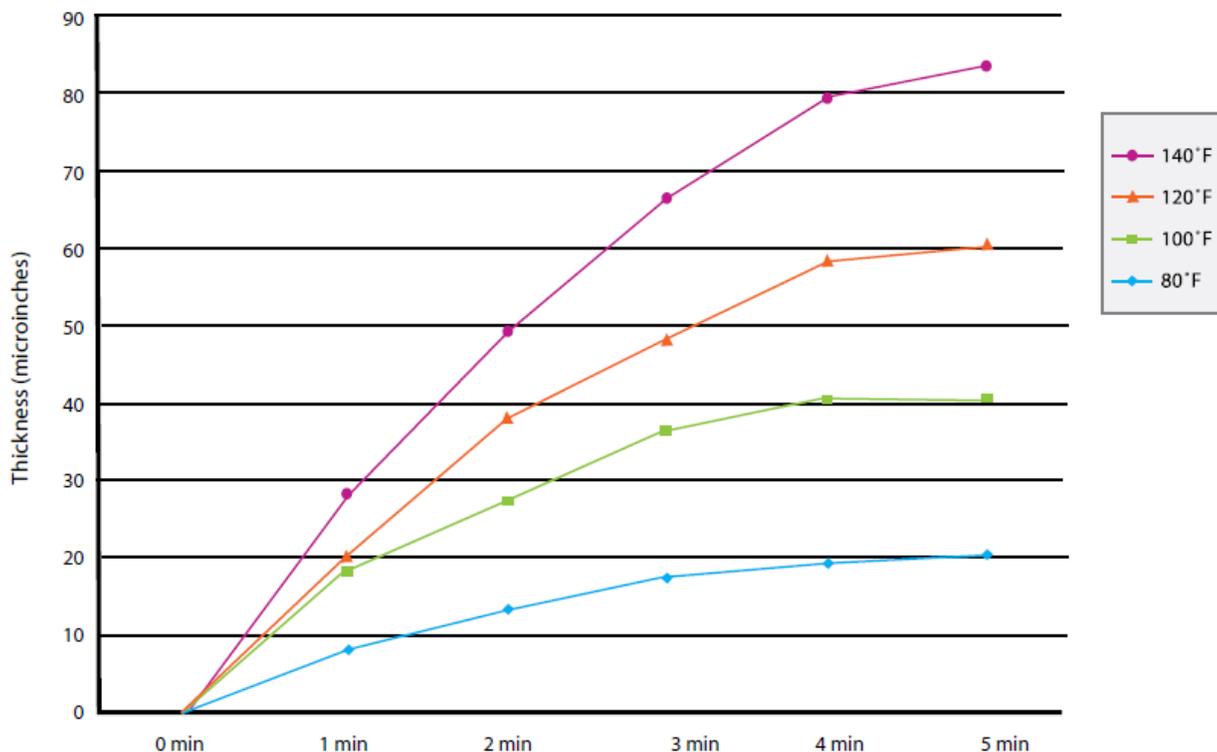


Figure 2. Tin deposition with respect to time and high temperatures



Health, Safety, and Environmental Awareness

Please see the 421 **Safety Data Sheet** (SDS) for more details on transportation, storage, handling and other security guidelines.

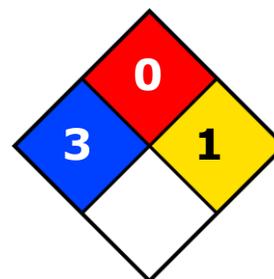
Health and Safety: Do not breathe vapor/spray/mists. Wear protective gloves/clothing/eye protection. Wash hands thoroughly after handling. Keep only in original packaging.

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

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)

Application Instructions

Follow the recommended process cycle below for copper.

Materials & Equipment

The liquid tin should be used with equipment made of polypropylene, polyethylene, Teflon, or similar materials. DO NOT use stainless steel. Heaters should be made of Teflon or quartz.

Reagents

- Deionized (DI) water
- Tap water

To tin copper or solder deposits

1. Clean the board.
2. Rinse cleaning residues with water.
3. Immerse in liquid tin for the duration corresponding to the thickness you need. (See Fig. 1 & 2)
4. Rinse with warm water.
5. Rinse with deionized (DI) water.
6. Dry.

NOTE: Dilution is not required. Volume lost due to evaporation can be replaced with deionized (DI) water. Chemical replenishment is not recommended.

Analytical Procedures

Titrimetric method measuring the percent activity of Liquid Tin (procedure # AP.0532.01)

Materials & Equipment

- 5.0 mL class "A" pipette
- 50.0 mL burette
- 250 mL Erlenmeyer Flask
- 25 mL graduated cylinder
- 2 x 1 L Volumetric Flasks

Reagents

- pH 5 acetate buffer—Weigh 245 g of sodium acetate trihydrate, add 58 mL of Glacial Acetic Acid. Dilute to 1 L with deionized (DI) water in 1 L volumetric flask.
- Methylthymol blue indicator—Dissolve 0.1 g of methylthymol blue indicator powder in 50 mL of deionized (DI) water.
- 0.10 M EDTA—Weigh 36.324 g of disodium EDTA dihydrate. Dissolve in 1 L volumetric flask with deionized (DI) water.

To titrate the tin plating solution

1. Pipette 5 mL sample of working bath into a 250 mL Erlenmeyer flask and add about 75 mL of DI water.
2. Add 25 mL of the pH 5 acetate buffer.
3. Add 10 drops of methylthymol blue indicator.
4. Titrate with 0.10 M EDTA to a faint yellow endpoint.
5. Record the results.

Calculation

- Percent Activity Liquid Tin = (mL 0.10 M EDTA used) x (M EDTA) x (85.9)

Packaging and Supporting Products

<i>Cat. No.</i>	<i>Packaging</i>	<i>Net Volume</i>		<i>Net Weight</i>		<i>Packaging Weight</i>	
421-125ML	Bottle	125 mL	4.22 fl oz	140 g	4.93 oz	1.7 kg ^{a)}	3.75 lb ^{a)}
421-500ML	Bottle	475 mL	1 pt	532 g	1.17 lb	2.4 kg ^{b)}	2.1 lb ^{b)}

a) Case pack of 10

b) Case pack of 4

Technical Support

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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ISO 9001 Registered Quality System.
Burlington, Ontario, Canada QMI File # 004008

Liquid Tin

421 Technical Data Sheet

421-Liquid

Warranty

M.G. Chemicals Ltd. warrants this product for 12 months from the date of purchase by the end user. *M.G. Chemicals Ltd.* makes no claims as to shelf life of this product for the warranty. The liability of *M.G. Chemicals Ltd.* whether based on its warranty, contracts, or otherwise shall in no case include incidental or consequential damage.

Disclaimer

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