Tinning solutions

Also widely referred to as “liquid tin”, it is a liquid used to cover copper traces on PCB with thin layer of tin.

Normally, such solutions consist of 3 components:

* Salt of tin  
  as a source of tin
* Reducing agent  
  compound which helps formation of tin from tin salt
* Stabilizers  
  normally, acids to prevent hydrolysis and remove oxides from surface of copper on PCB

Contents

[Liquid Tin from MGChemicals 2](#_Toc86761465)

[SOLDERON™ PC TIN HC 2](#_Toc86761466)

[Yates & Bird / Motloid company 3](#_Toc86761467)

[CASWELL INC. 3](#_Toc86761468)

[NIST 3](#_Toc86761469)

[Fortex 3](#_Toc86761470)

[Home brew 5](#_Toc86761471)

[Home brew by NurdRage 6](#_Toc86761472)

# Liquid Tin from MGChemicals

Part Number 421-125ML, 421-500ML

There are 2 MSDS issued in different times with different compositions:

From the MSDS in aqueous solution (as of 11 April 2016):

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 16872-11-0 | Fluoroboric acid |  | 9-11% |
| 13814-97-6 | Tin fluoroborate[[1]](#footnote-1) |  | 9-11% |
| 62-56-6 | Thiourea |  | 4-6% |

From the MSDS in aqueous solution (as of 17 March 2020):

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 16872-11-0 | Fluoroboric acid |  | 10% |
| 13814-97-6 | Tin fluoroborate |  | 4% |
| 62-56-6 | Thiourea |  | 10% |
| 10043-35-3 | Boric acid |  | 1% |

# SOLDERON™ PC TIN HC

According to SDS, it is aqueous solution containing:

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 75-75-2 | Methane sulfonic acid |  | 1.0 … 5.0 % |
| 53408-94-9 | Tin(II) methanesulphonate |  | 45 … 55 % |

# Yates & Bird / Motloid company

According to MSDS, is an aqueous solution containing:

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 7664-93-9 | Sulfuric acid |  | 10% |
| 7488-55-3 | Stannous sulphate |  | 3.75% |

However, it also mentions the proprietary surfactant blend referred to as “Techni Matte Tin 89T Makeup”.

# CASWELL INC.

This solution is similar to previous one, but doesn’t contain surfactants and differs in concentration

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 7664-93-9 | Sulfuric acid |  | 2% |
| 7488-55-3 | Stannous sulphate |  | 19% |

However, it is a concentrate and needs to be diluter before use.

# NIST

According to Safety Datasheet, it is an aqueous solution containing:

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Concentration (% weight) |
| 7697-37-2 | Nitric acid |  | 5% |
| 7664-39-3 | Hydrofluoric acid |  | 1% |
| 41480-79-9 | Tin nitrate |  | 3% |

# Fortex

This composition is sold as dry powder for further dissolving in water. The powder contains (according to MSDS):

|  |  |  |  |
| --- | --- | --- | --- |
| CAS# | Chemicals | Formulae | Weight % |
| 62-56-6 | Thiourea |  | 50 … 75 % |
| 77-92-9 | Citric acid |  | 15 … 30 % |
| 7772-99-8 | Tin (II) chloride |  | 5 … 15 % |

# Home brew

This recipe is found:

* <https://rustaste.ru/zhidkoe-olovo-svoimi-rukami.html>

Content:

* : 14 g
* 33% : 55 ml
* : 55 g
* : 35 g
* : 15 ml
* Bismuth-Iodine complex: 0.6 g
* Dishwashing liquid: 3-6 ml
* Distilled water

# Home brew by NurdRage[[2]](#footnote-2)

Get 1g of lead-free tin solder containing 95% or more of tin metal without core flux. Check the MSDS to be sure. Now to the solder we add 10mL of 30% hydrochloric acid. The solution will bubble hydrogen as the tin dissolves. Leave it overnight and pour off the clear liquid into 100mL of commercial metal polish that contains thiourea. I used "Tarn-X" brand for my experiments. You can also buy thiourea directly and use 5g per 100mL of water directly along with 1g of sulfuric acid. Anyway, however you obtain your thiourea solution, the added tin chloride will make it into a tinning solution.

Now just add in copper metal like that of a PCB and a thin layer of tin will coat it.

1. Also called “Stannous Fluoroborate” [↑](#footnote-ref-1)
2. <https://www.youtube.com/watch?v=Hsw3lOnHaas> [↑](#footnote-ref-2)