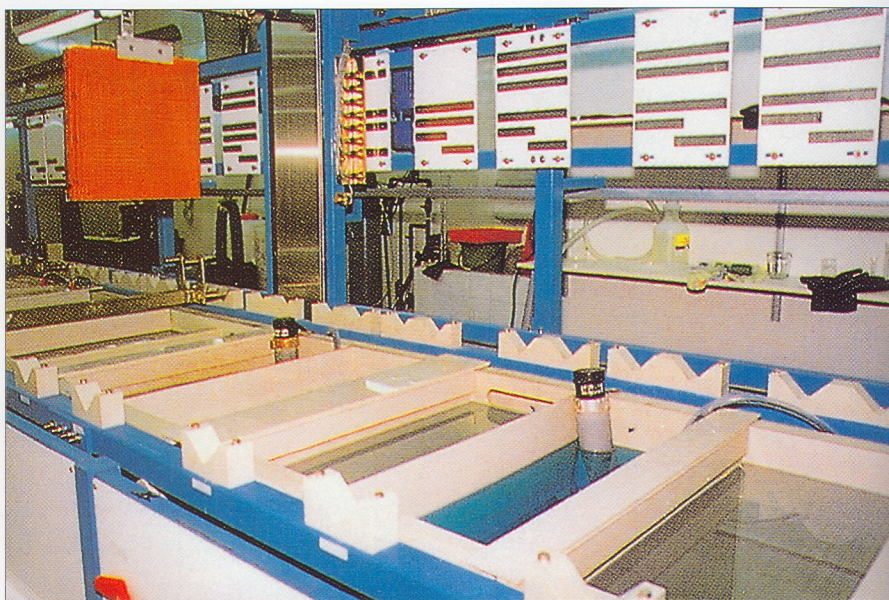


## Reducing toxic wastes in electronic manufacturing



### Background

The manufacture of printed circuit boards (PCB) traditionally involved the electrodeposition of a tin/lead alloy onto the copper circuit of the PCB. This alloy coating protected the copper circuit during the etching process. The tin/lead electroplating bath contained 30 per cent toxic lead metal and fluoroborate-based waste which were difficult to treat.

### Enabling technology

A new process was introduced, in which pure tin was used as the coating with sulphate-based plating. This eliminated lead and fluoroborate from the wastewater which was therefore easier to treat. The new technology was developed by the manufacturers of electroplating chemicals.

### Advantages

The new process has been in operation for two years, and there are no adverse effects on the product quality. The advantages are as follows:

- ❖ Lead and fluoroborate are eliminated from the wastewater
- ❖ Wastewater treatment is simplified
- ❖ The costs of wastewater treatment are reduced
- ❖ Initial investment is low
- ❖ Since the new process involves only the direct substitution of tin/lead plating with pure tin plating, it does not affect other manufacturing processes.





## Economic benefits

While the raw material cost for pure tin plating is slightly higher than that for tin/lead plating, the increased material cost is offset by the cost reduction in waste treatment.

The initial investment was about US\$1730, which was the cost of replacing the tin/lead plating bath by a pure tin plating bath.

The recurrent raw material cost for pure tin plating, including the cost of regular replenishment of the pre-dip chemical and plating bath, is about US\$5350/year more than that for tin/lead plating.

However, the increase in the recurrent raw material cost can be approximately offset by the reduction in the cost of wastewater treatment.

## Country

Hong Kong

## Industry

Electronics

## Company

The company was established in Hong Kong in 1989 and now employs more than 200 people. The factory is engaged in the production of double-sided and multi-layer printed circuit boards for telecommunications products. The company's major manufacturing processes include circuit imaging, circuit etching and metal plating. Its products are mainly exported to the United States and Europe.

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Example of Multi-layer PC Board Manufacturing Process Flowchart

