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# Ionic Palladium Recovery System

## Project Description

## 1. Projec Overview

PCB and plastic electroplating industry produce a large amount of ionic palladium waste liquid, which has a high recycling value. If the environmental protection treatment cannot be carried out reasonably, it will cause serious waste of resources and on the other hand, heavy metals will infiltrate into the soil and water after being discharged. It will cause serious pollution and harm to the natural environment and our own health.

In recent years, the traditional ionic palladium recovery equipment uses resin to absorb the palladium but the efficiency is only less than 70% since palladium will be lost during refining process. The operating cost is high, the efficiency is low and the complicated post-processing is required to extract pure palladium, resulting in increased costs and environmental protection.



Traditional Tower Type Recovery Equipment

In order to solve the above problems, our company has developed a new technology to improve the efficiency of the Ionic Palladium recycling system.



## 2. Equipment Introduction

### 2.1 Project Description

Ionic Palladium recovery System

### 2.2 Project Principle

- Simple and mature treatment technology to ensure the treatment effect and achieve energy saving. Emission reduction and reuse of valuable resources with clean production
- The system takes into account of high-tech, advanced knowhow and superiority with reasonable operating cost and convenient operation
- Reasonable use of layout, strong facility integration and minimize space occupation
- The system can be operated off-line or in-line without affecting normal production

### 2.3 Project Target

The recovery rate of palladium can reach more than 90% and the recovered product is high-purity metal which has a high recovery value. It can reduce expensive and environmentally polluting post-processing and improves the overall efficiency of the enterprise.

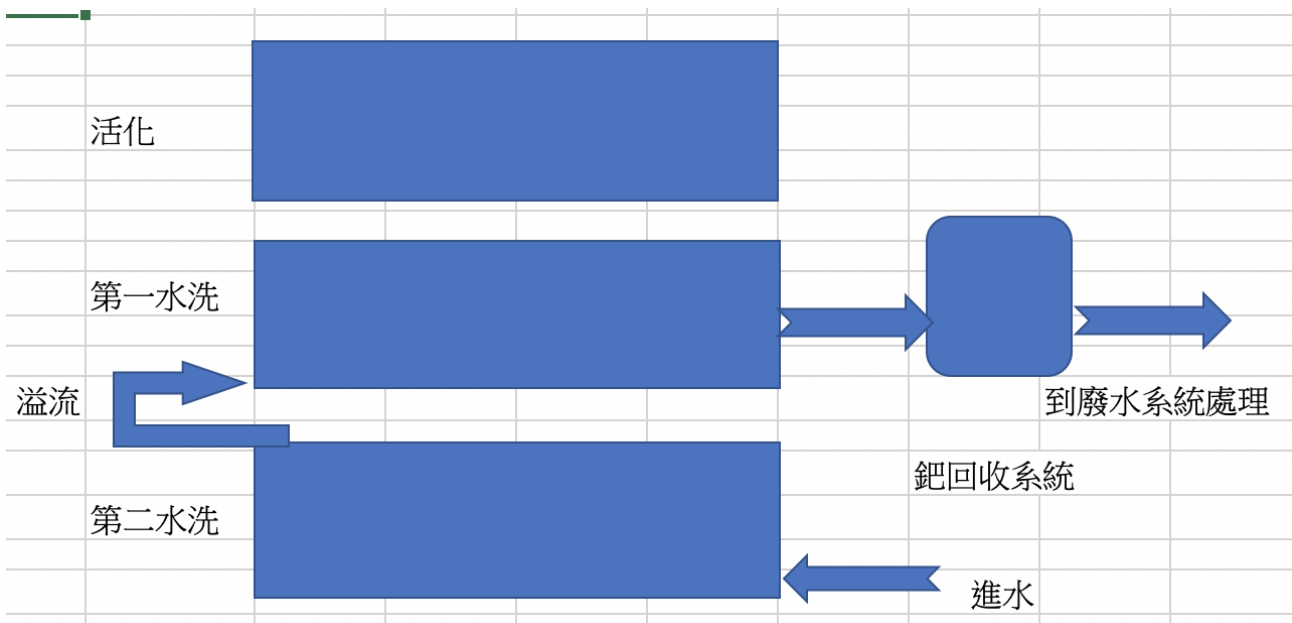
### 2.4 Project Object

- PCB Ionic Pd Electroless Ni/Pd/Au Line

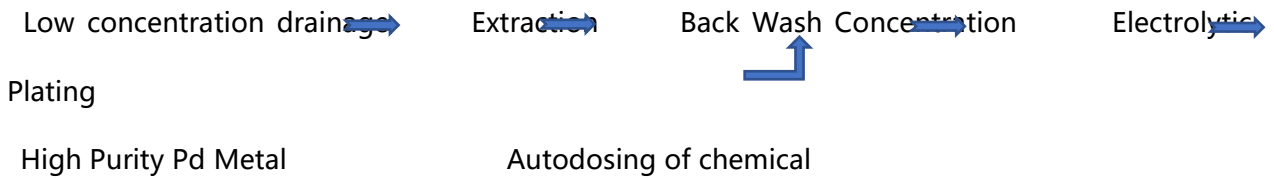
- PCB Ionic Desmear / PTH Line
- Ionic Pd POP Line
- OLED Ionic Electroless Ni/Pd/Au Line

## 2.5 Project Process Flow Chart

- High concentration palladium waste liquid from the activator tank which needs to be replaced regularly can be recovered.
- Low concentration palladium waste from overflow rinsing tank after activator tank can be recovered



## 2.6 Process Flow



## 2.7 Recovered Product and Pd Content Analysis

### 2.7.1 Comparison of Waste Before and After Treatment

Waste Pd Content Before Treatment : 0.16mg/L

Waste Pd Content After Concentration : 0.75mg/L

Waste Pd Content After Treatment <0.075mg/L

Base on Activator Pd content 12ppm

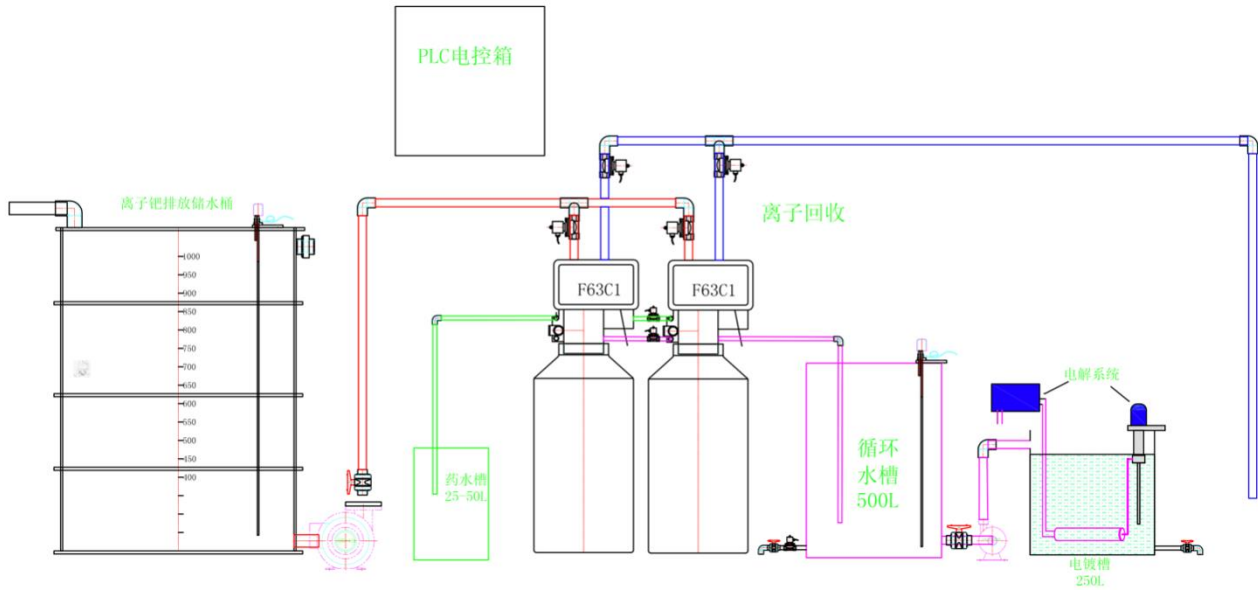
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### 2.7.2 Recovered Product

Pure Palladium Metal (Purity>99%)



## 2.8 Ionic Pd Recovery Equipment



Extraction



Electrolytic Plating

Approx. Space requirement : 2mW x 5mL x 2mH

## 3. Benefit of the Recovery System

1. The recovered product is in pure Pd metallic form, the selling price of the product is higher than the typical Pd resin



2. No need to regularly change the resin, reduce environmental pollution when handling combustion of the resin
3. All recovery processes are done inside the factory, customer can clearly understand the quantity (weight) of the product produced, no need to rely on the data provide by the recycler.

## 4. Joint Operation and Cooperation Mode (BOO)

### 1. Responsibility

- Customer is responsible for providing palladium water rinsing waste liquid / palladium filter sludge, space for equipment, water, electricity and arrangement for equipment to enter into the plant
- Our company is responsible for the design of the equipment and recycling scheme, equipment construction, daily operation, provision and maintenance of the adsorption chemical (customer do not need to invest any money)
- Our company is responsible for the sales of recycled products

### 2. Term of agreement

- Five to Six years agreement after installation of equipment

### 3. Share proportion



- The profit from palladium sales are divided into 50% for customer and 50% for our company

#### 4. Sampling and analysis

- Both parties work together

#### 5. Promise

- If palladium cannot be recovered after installation, our company will remove the equipment for free.

**Table 3-1 Estimate Benefit Analysis For PCB Customers**

Item	Description		Unit
1	Output	50000	m2/M
2	Activator Pd Con	100	ppm
3	Dragout	100	ml/m2
4	Pd Dragout Quantity	500	g
5	System efficiency	90	%
6	Final Pd Recovered	450	g/M
7	Palladium SMM Price	50	USD/g
8	Recycler Purchase Discount	90	%
9	Pd Net Selling Price	45	USD/g





10	Total Monthly Pd Sales Revenue	20250	USD
11	Customer Share	50	%
12	Customer Monthly Revenue	10125	USD
13	Customer Yearly Revenue	121500	USD

**The above data is calculated according to the monthly production of 500000 ft2 Vertical Basket Line for PCB customers**

**The above data is calculated according to the Activator Pd content > 100ppm.**

**The above data are for reference only, the correct budget can only be made according to the actual situation on site.**

#### 4. Project Implementation Plan Cycle

The total construction period of palladium recovery and treatment system is about 20 days (Equipment production about 10 days, equipment installation, commissioning and operation lasts 3 days) + (Equipment commissioning about period 7 days) , The main construction tasks of the system include: :

- 1、Installation drawing design: (Including process, equipment placement, electrical, general drawing, etc) ;
- 2、System installation: (Recovery tank, storage tank, pipeline, electrical circuit, etc) ;



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### 3、System commissioning: system and operator training, etc