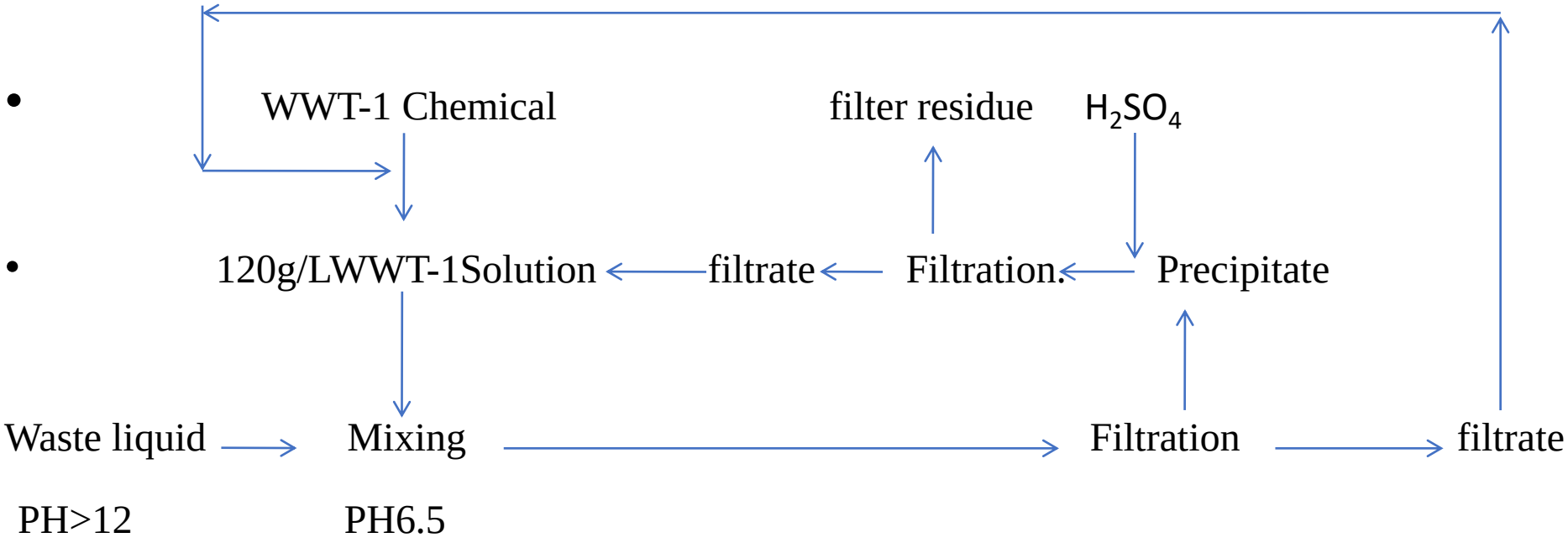
# WWT-1 Recovery System for Waste Water of Dry Film Stripping, Developing & Solder Mask Process

# 1. Printed Board Dry Film Stripping, Developing, Solder Mask Waste Liquid (High Concentration COD) Treatment and Recycle System

- Dry Film stripping, development and solder mask waste water contain a large amount of polymers and organic amines. In the past, inorganic acids were used to condense them to form a very viscous glue which will adhere to the filter cloth and block the filter cloth. Filter holes make filtration and desmear quite difficult. Although the addition of activated carbon as a filter aid has improved, the comprehensive effect of COD reduction, organic matter removal and copper removal is not ideal.
- 1. Consignment Processing Fee USD 1500 /Ton (China)
- 2. Self Handling USD 200 /Ton (information from Customer)
- 3. WWT-1Treatment System <USD 30/Ton (Estimated)

# 2. Treatment and Recycle Process For Dry Film Stripping, Developing and Solder Mask Waste Water



# 3. Acidification-Oxidation-Carbon Powder Three-Stage Treatment Method (Self –Treatment Method)

- The wastewater is firstly adjusted to pH 2-3 by adding sulfuric acid in the acidification tank, the organic photosensitive film is precipitated and the scum formed is taken out. The supernatant is then pumped into the oxidation tank. NaOH is added to adjust the pH to 3-3.5, hydrogen peroxide and FeSO4 is added after the reaction is completed. Add NaOH to adjust the pH to 8-10 to precipitate a large amount of oxidized organic matter and the sludge formed by the precipitation is sent to the sludge tank. After being filtered by the filter press the COD of the clear water can reach 100-150 mg/L. Then pump it into the oxidation tank and react with the filler in the tank through blower stirring and the effluent enters the reaction tank then add carbon powder for adsorption. Add PAC, PAM to completely flocculate and precipitate the organic matter and heavy metals remaining in the water and enter the precipitation. According to the information of the PCB factory, the treatment cost per ton of wastewater for this treatment method is USD55, the COD value of wastewater can reach the standard (<100 mg/L) and the concentration of heavy metals can also reach the standard.

- Acid $NaOH,H_2O_2,FeSO_4$ Blower Agitation
- File Stripping/ Solder Mask ↓ ↓ ↓
- Waste water →Acidification Tank→ Oxidation Tank-→ Sludge Tank---→ Oxidation tank→
- pH2-3 Firstly Adjust to pH3.5
- Then Adjust to pH8-10
- Carbon Powder PAM, PAC
- ↓
- → Carbon treatment Tank → Sedimentation → Waste Water (Standard Discharge)

# 4. WWT-1 New Process For Treating High Concentration COD (Primary Treatment)

- Features：
- A. It can effectively neutralize the alkali in the wastewater and can significantly reduce (about 70%) the concentration of COD and copper ions in the wastewater (>80%)；
- B. The sediment is not viscous and easy to pump with filter and Filter Press
- C. Rapid precipitation reaction, short processing time of 40-60 minutes, easy to use, suitable for use in waste water tanks of various capacities；
- D. WWT-1 is suitable for mixed treatment of dry film stripping and developing waste water。
- E. Improving the lifespan of the membrane technology water reuse equipment
- F. WWT-1can be recycled from the waste residue and continue to be used after acidification

# 5. WWT-1Treatment Condition

- Condition of Use：

| | |
|---|---|
| • WWT-1 treatment Powder | Use120(100-250)g/l to neutralize the treatment solution to pH 6.2, then calculate the consumption |
| • PH | 6.0-6.5 |
| • Time | 5-20min |
| • Temperature | Ambient Temp |
| • Agitation | Required |

# 6. WWT-1 Treatment Of High Concentration Organic Waste Liquid

# 7. Treatment Effect

- A. Treatment for Dry Film Stripping Waste
- Table 1 Difference in concentration of COD and Cu2+ before and after the treatment of Dry Film Stripping waste liquid

| | Before Treatment | After Treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 12.8 | 6.0 | |
| COD Value mg/L | 6800 | 410 | 93% |
| [Cu2+], mg/L | 48 | 6 | 88% |

- The results in Table 1 show that WWT-1 has a high removal rate of COD in the dry film stripping waste liquid and can remove 93% of COD and 88% of the copper removal rate. It is a special agent for treating the dry film stripping waste liquid.

- B. Treatment for Developing Waste
- Table 2 Difference in concentration of COD and Cu2+ before and after the treatment of Developing waste liquid

| | Before Treatment | After treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 10.9 | 6.0 | |
| COD Value mg/L | 908 | 188 | 79.3% |
| [Cu2+], mg/L | 36 | 5 | 86% |

- C. Treatment for Solder Mask Waste
- Table 3 Difference in concentration of COD and Cu2+ before and after the treatment of Solder Mask waste liquid

| | Before Treatment | After Treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 13.1 | 6.0 | |
| COD Value mg/L | 9080 | 1634 | 82% |
| [Cu2+], mg/L | 52 | 9 | 82.7% |

- D. Treatment for Alkaline Degrease Waste
- Table 4 Difference in concentration of COD and Cu2+ before and after the treatment of Alkaline Degrease waste liquid

| | Before Treatment | After Treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 14.2 | 6.0 | |
| COD Value mg/L | 9873 | 987 | 90%% |
| [Cu2+], mg/L | 22 | 4 | 81.8% |

## E. Treatment for Resin Flux Waste

- Table5 Difference in concentration of COD and Cu2+ before and after the treatment of Rosin Flux waste liquid

| | Before Treatment | After Treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 13.7 | 6.0 | |
| COD Value mg/L | 198730 | 31000 | 84.4% |
| [Cu2+], mg/L | 86 | 15 | 82.6% |

## F. Treatment for Emulsification Waste

- Table 6. Difference in concentration of COD and Cu2+ before and after the treatment of Emulsification waste liquid

| | Before Treatment | After Treatment | Removal Rate % |
|---|---|---|---|
| pH Value | 13.8 | 6.0 | |
| COD Value mg/L | 43058 | 9472 | 78% |

- The above results show that WWT-1 high-concentration COD waste liquid treatment agent is a special agent for removing macromolecular polymers, organic compounds and surfactants. It can remove 70-90% of COD value in one treatment and can also remove more than 80% copper ions. It only takes a few minutes for one treatment while other methods need to go through many steps, take hours and need to invest a lot of various treatment agents and a lot of manpower to achieve the same effect. Compared with this, WWT-1 treatment process is a treatment process that costs less, faster and has better results. It is a new product independently developed by our own. It has its own intellectual property.