



THREE PALMS P&A

Chemicals Create the Future

Tank Cleaning Agent Series Catalog

To everyone involved in printed circuit board.

We will totally coordinate optimal tank
cleaning program for your important line !



Cleaning Revolution

Words from developers

The implementation of "tank cleaning maintenance" is becoming more important, and I feel that the expectations for the chemicals used are becoming more and more focused on the demands that bring about a total improvement effect.

Trajectory as a developer

- i) Through visiting many sites, I have checked the situation and experienced the actual work.
- ii) The following three improvements were set as the product realization goals.
 - Develop high-performance chemicals and pursue sustainable effects.
 - Simplify work procedure and cost reduction.
 - Achieve in-house treatment of waste liquid.
- iii) We have achieved a simple cleaning program and developed a direct neutralization cleaning method as an original technology.

Toward the realization of our concept, hundreds of on-site cleaning witnesses, analysis and testing of provided sample, data tracking after implementation are also the trajectory and history that we have gone on with our customers.

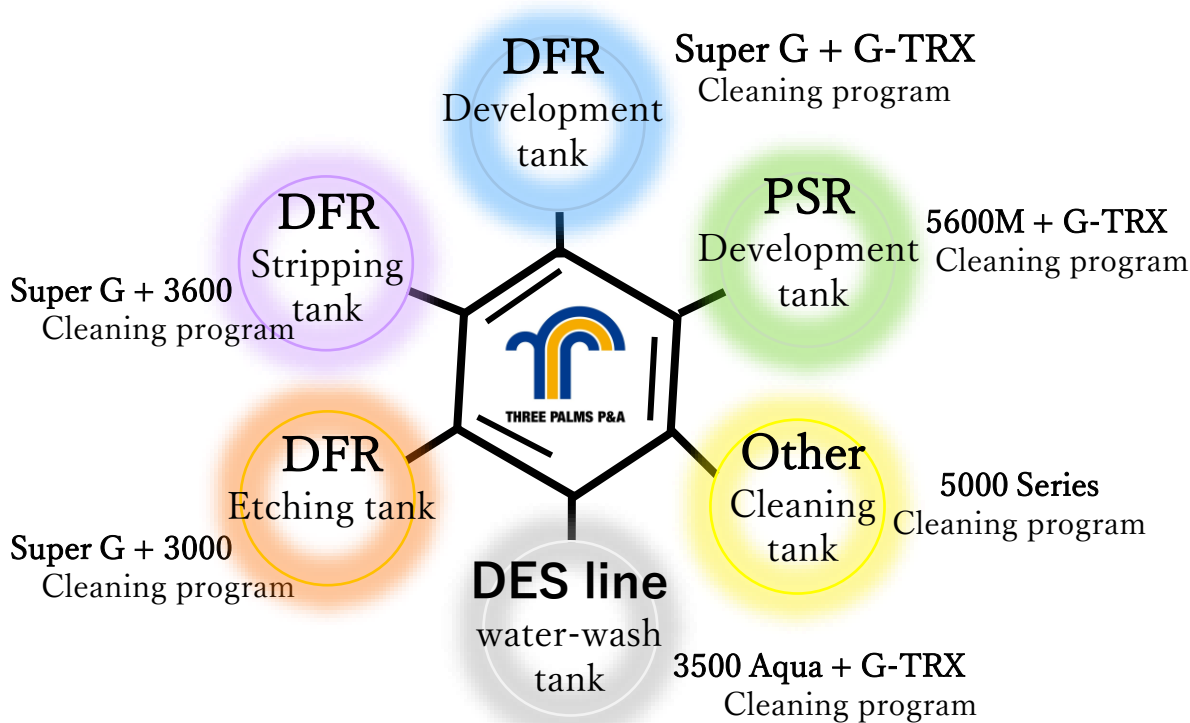
We would like to express our deep gratitude to our customers for their efforts to improve QC activities and defects.

Which really helped us to develop the tank cleaning series this time.

**Suitable for
all cleaning**

Select optimal cleaning

- **Correlation between** **program !**
corresponding process of our product and the cleaning program

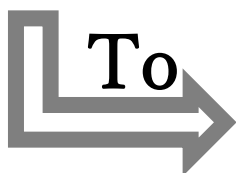


For development tank cleaning
/ stripping tank cleaning

The simple cleaning program
is
the best way !!

*To new customer
adopting our product !*

The First cleaning program



The simple cleaning program

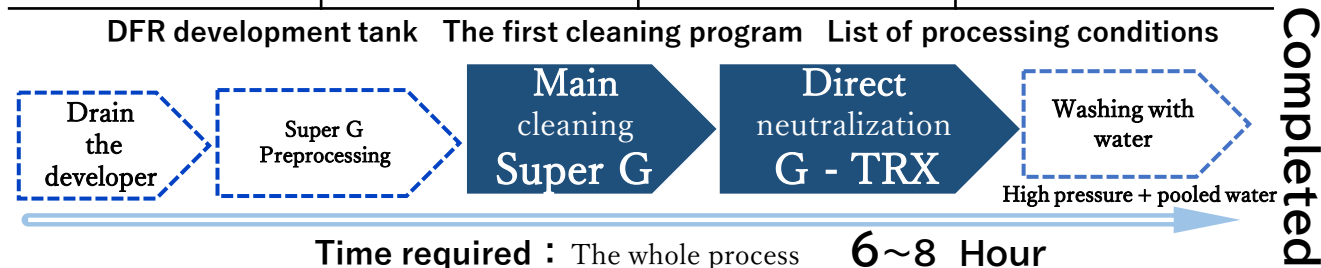
* Recommendations for you
Conduct within 3 month

- * Suitable for the first cleaning when switching from another company's product to our product.
- * Suitable for DFR development tanks, stripping tanks and PSR development tanks cleaning.
- * In addition, you can use it with an operation method (program) that suits your needs and the site environment.

The First cleaning program

Program for **new customers** Who adopt our cleaning.
Complete reset of residue.

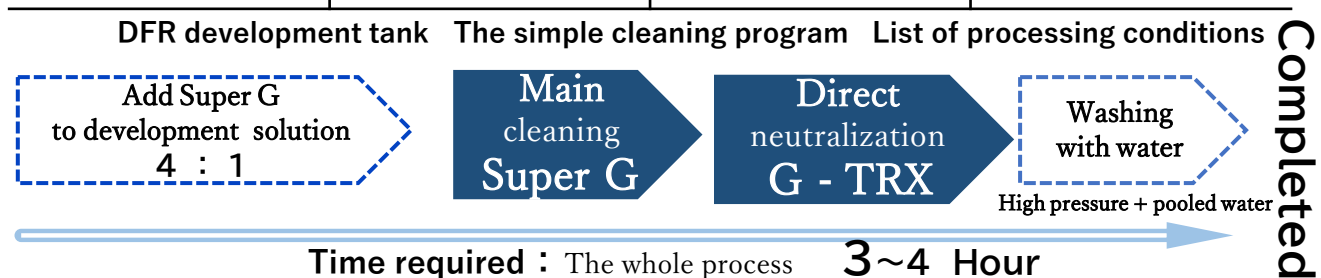
| ■ Dissolve and remove stuck material on the tank wall. | ■ Dispersed discharge of sediment in pipes. | ■ Can wash off cleanly around heat exchanger. | |
|--|---|---|--------------------------|
| Product to use | Concentration conditions | Recommended processing temperature | Standard processing time |
| Parmless Super G | 50 v% | 30℃±5 | 2 Hour |
| PAM Process G-TRX | 5 v% | | 30 Minute |



The simple cleaning program

Continuous conducting
Conduct after the first cleaning
 ... Recommend 1-3 month cycle

| ■ Can conduct by adding to an aged developing solution. | ■ No need to remove nozzle. | ■ Drainage of treatment liquid is possible. | |
|---|-----------------------------|---|--------------------------|
| Product to use | Concentration conditions | Recommended processing temperature | Standard processing time |
| Parmless Super G | 20 v% | 30℃±5 | 1 Hour |
| PAM Process G-TRX | 2.5 v% | | 15 Minute |



In addition

■ Super G **supports** a variety of programs ! ■ **Can choose** usage for you needs !

- ☐ I want to reuse the stock solution.
 - **Multiple cleaning is possible**
by recycling for cleaning, collection, and re-cleaning.
- ☐ I want to reuse the first cleaning treatment liquid to another line.
 - **Can reuse** for the first cleaning of up to 3 lines.
- ☐ I want to reuse it for cleaning the stripping tank.
 - **Can reuse** for cleaning the stripping tank.
The 50% treatment liquid. (in the development tank)

Before



After



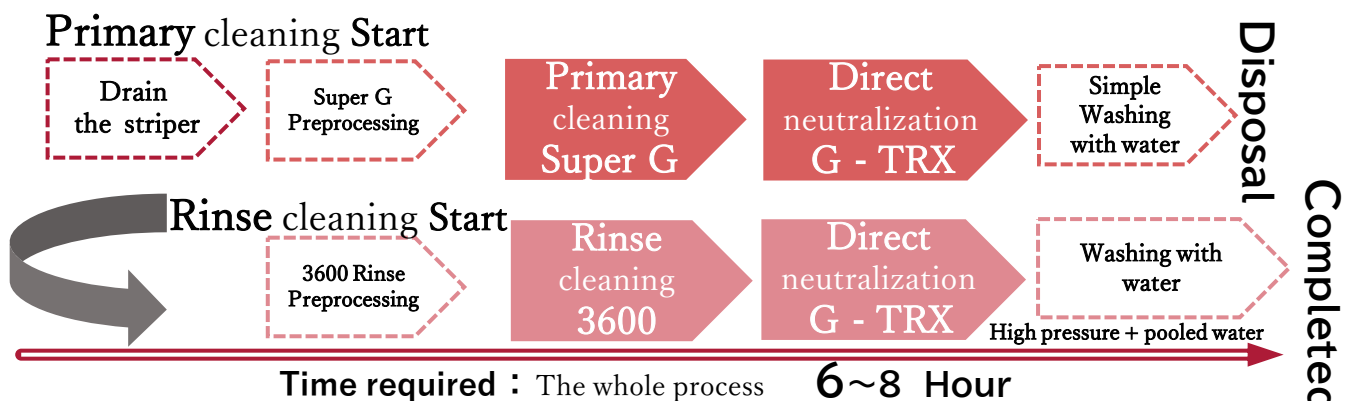
The First cleaning program

Program for **new customers** Who adopt our cleaning.
 . . . **Complete reset of Black adhering material**

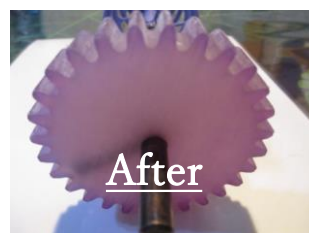
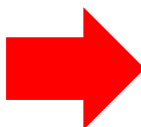
- The resist component is dissolved and removed by the primary cleaning.
- Black crystals are dissolved and removed by rinsing
- The inside of the tank is cleaned by 2-step cleaning.

| Product to use | Concentration conditions | Recommended processing temperature | Standard processing time |
|--------------------|--------------------------|------------------------------------|--------------------------|
| Parmless Super G | 50 v% | 30℃±5 | 2 Hour |
| Parmless3600 rinse | 20 v% | | 1 Minute |
| PAM process G-TRX | 5 v% / 10 v% | | 15 Min / 30 Min |

DFR stripping tank The first cleaning program List of processing conditions



Before



After

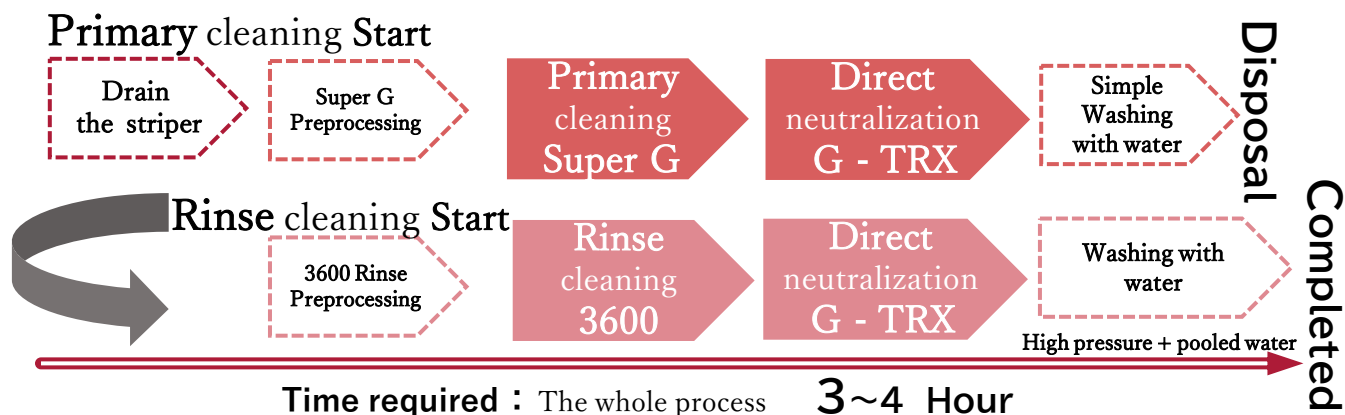
The simple cleaning program

Continuous conducting
 Conduct after the first cleaning.
 . . . Recommend 3-4 month cycle

- The amount and time of chemicals is 1/2 of the first cleaning.
- Rinse cleaning can be skipped.
- Due to its alkaline, wastewater can be drained into drains.

| Product to use | Concentration conditions | Recommended processing temperature | Standard processing time |
|--------------------|--------------------------|------------------------------------|--------------------------|
| Parmless Super G | 20 v% | 30℃±5 | 1 Hour |
| Parmless3600 rinse | 10 v% | | 30 Minute |
| PAM process G-TRX | 2.5 v% / 5 v% | | 10 Min / 15 Min |

DFR stripping tank The simple cleaning program List of processing conditions



DFR stripping tank Super G + 3600 Cleaning Program

The First cleaning program

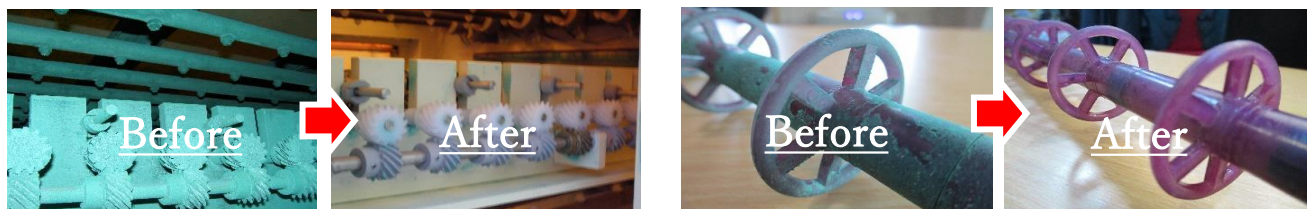
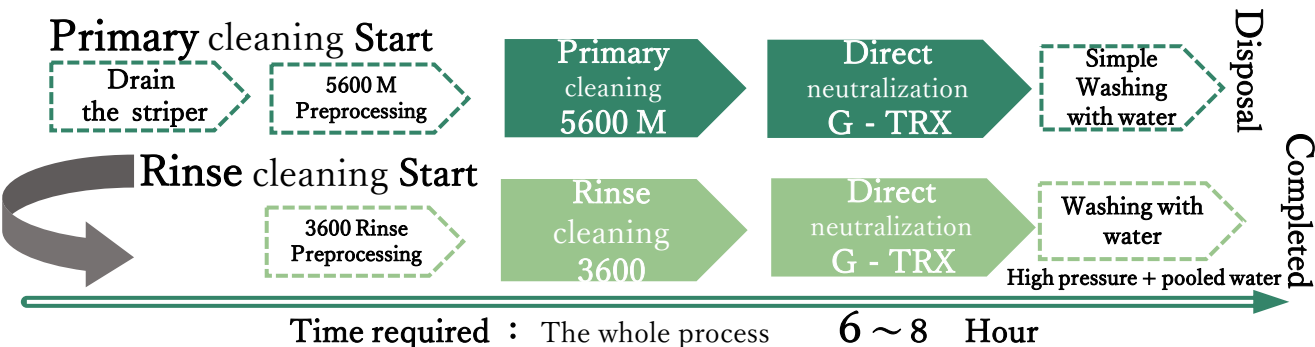
Program for **new customers** Who adopt our cleaning.

• • • **Complete reset of White crystals.**

- The resist component is dissolved and swelling by the primary cleaning.
- White crystals are dissolved and removed by rinsing
- The inside of the tank is cleaned by 2-step cleaning.

| Product to use | Concentration conditions | Recommended processing temperature | Standard processing time |
|--------------------|--------------------------|------------------------------------|--------------------------|
| Parmless 5600M | 50 v% | 30℃±5 | 2 Hour |
| Parmless3600 rinse | 20 v% | | 1 Minute |
| PAM process G-TRX | 5 v% / 10 v% | | 15 Min / 30 Min |

PSR development tank The first cleaning program List of processing conditions



The simple cleaning program

Continuous conducting

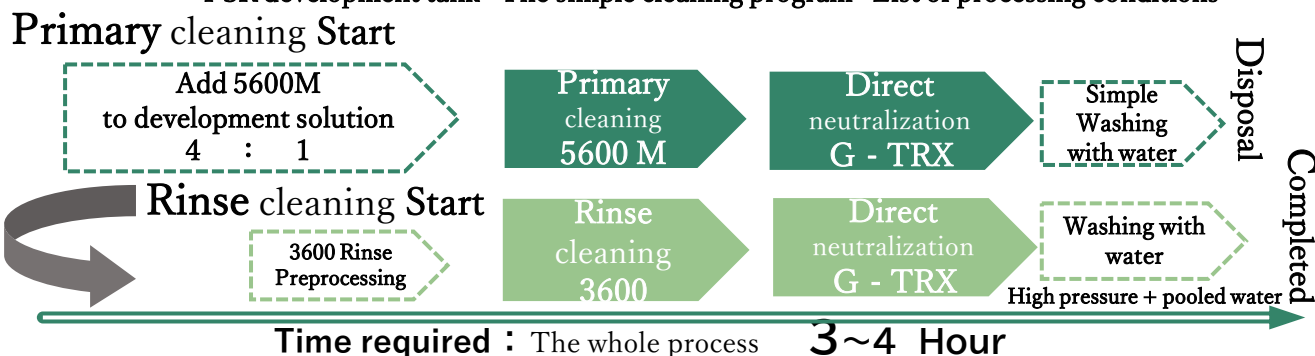
Conduct after the first cleaning

... Recommend 3-4 month cycle

- The amount and time of chemicals is 1/2 of the first cleaning.
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| Parmless 5600M | 20 v% | 30℃±5 | 1 Hour |
| Parmless3600 rinse | 10 v% | | 30 Minute |
| PAM process G-TRX | 2.5 v% / 5 v% | | 10 Min / 15 Min |

PSR development tank The simple cleaning program List of processing conditions



→→ The simple program is able to skip the rinse cleaning process of this part . ←←

In addition • • • • •

■ **5600M supports** a variety of programs !

■ **Can choose** usage for you needs !

☐ I want to reuse the stock solution.

☐ I want to reuse the first cleaning treatment liquid to another line.

■ **Multiple cleaning is possible**

by recycling for cleaning, collection and re-cleaning.

■ **Can reuse** for the first cleaning of up to 3 lines.

■ Voices of Troubles from the Field !

- ◇ Take too much **time** and **effort**.
- ◇ Disposal of waste liquid is a lot of **difficult** and **costly**
- ◇ The cleaning **effect** is immediately **lower**.
- ◇ want to **reduce defects**.

■ Arrived ! Voice from Users!

■ Experience **excellent** cleaning **performance !**

- ◇ **Perfect cleaning** without any stain residue! **Powerful detergency** despite low concentration!
- ◇ Washed out completely in about **an hour!**
Yellow viscous material and thick solidified deposits on the tank wall are **gone!**
- ◇ Wash treatment is **2 times enough** with high pressure + pool water After G + G-TRX!

■ **Working process** are greatly improved by **introducing a simple cleaning program !**

- ◇ Work time has been **reduced** to **1/3** of the conventional time,
and maintenance can be carried out on weekdays !
- ◇ It can be added directly to the developer in the tank, and it has **achieved 1 hour** of main cleaning
and **3 hours of total work** without foaming !
- ◇ Drainage is now **possible**, eliminating the need for drum collection, storage and transportation. !
- ◇ The G-TRX additive treatment liquid can be added into the resist-based alkaline storage tank,
reducing industrial waste !

■ The problem has been improved! **Dramatically improved** **sustainability** of cleaning effect !

- ◇ It is **easy** to make an **implementation plan** because the treatment conditions for concentration
and time are constant each time !
- ◇ **Maintains** the effect after cleaning and has the effect of preventing the occurrence of defects
again !
- ◇ By eliminating the collection of waste liquid, we were able to create superiority such as unnecessary
storage space and **reduction** of industrial waste **costs!**

Dry film stripping tank Cleaning

■ Voice of Trouble from the Field !

- ◇ Which chemicals are **suitable** for cleaning. ◇ Black residues **are stuck** to the tank.
- ◇ Difficult to understand the cleaning **procedure** . ◇ I don't know **how often** to wash.

■ Arrived ! Voice from Users!

■ Convenience!

Super G can be used **both** cleaning tank !

- ◇ As possible to **reuse** from the development tank cleaning liquid to the stripping tank cleaning, it has been gotten **massive** effect of **reduction** in both **expense** and **time** !
- ◇ The stubborn black residues were **completely removed** with the addition of the 3600 Rinse !

Resist development tank Cleaning

■ Voice of Trouble from the Field !

- ◇ Stubborn white crystals **remain** in the tank. ◇ Difficult to know to perform cleaning.
- ◇ Disposal of waste liquid has lots of **difficulty** and **cost**. ◇ Take too much **time** and **effort**.

■ Arrived ! Voice from Users!

■ The best cleaning is **possible**
for **every types** of ink !

- ◇ The 5600M was **no problem of its ability** of cleaning power despite of contained white and black ink but others product is affected it !

■ **Experienced** high cleaning performance
with **quick** removal !

- ◇ Adding the 3600 Rinse cleaning after the 5600M cleaning **completely removed** the white crystals in about **30 minutes** !

■ **Working process** are greatly improved
by **introducing a simple cleaning program** !

- ◇ **A 90-day cycle cleaning** was completed by introducing a simple program of # 5600M 20% addition method !

■ Comparison between other company's and Three palms P & A.

| Item | Other company's | Three Palms P&A |
|-----------------------------|-----------------|-----------------|
| Product selection | △ | ○ |
| Product capabilities | ○ | ◎ |
| Operation method | △ | ◎ |
| Working/ performance | △ | ○ |
| Handling of waste liquid | × | ○ |
| Cost performance | △ | ○ |



■ Three palms P & A 's proposal for improvement.

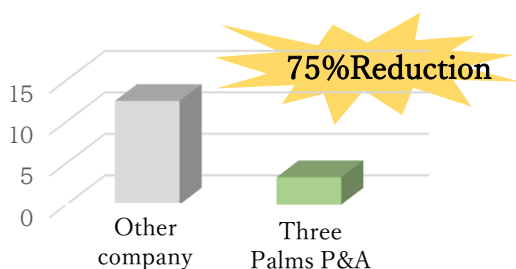
| | |
|-----------------------------|--|
| Product selection | As it is highly diversity, just make a selection for DES or PSR |
| Product capabilities | The effect lasts for a long time due to the excellent cleaning ability and the introduction of simple cleaning. |
| Operation method | No liquid deterioration due to simple cleaning during the cycle period. (within 3 months) |
| Working/ performance | Half a day work enable because of simple operation of adding directly from drum and drainage method. |
| Handling of waste liquid | No need outsourcing costs in case of in-house wastewater treatment. |
| Cost performance | The costs of chemicals can be significantly reduced by using both main cleaning and simple cleaning. |

■ Comparing cleaning processes .

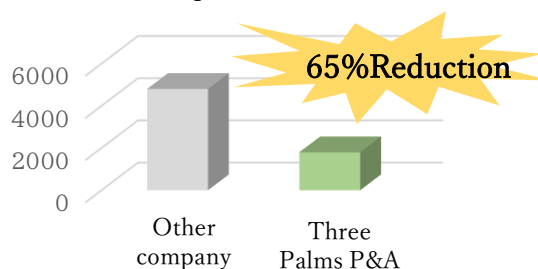
Advantages of introducing a simple program calculated from the required time and the amount of waste liquid.

| | Number of processes | Processing time (Shortest / longest) | Number of disposals | Waste liquid amount (Includes developing liquid) |
|-----------------|---------------------|--------------------------------------|---------------------|--|
| Other company | 20processes | 6.3 h / ~12.5 h | 6times | 4800 ℓ |
| Three Palms P&A | 11processes | 2.0 h / ~3.3 h | 3times | 1800 ℓ |
| Outcome (≒) | 50% | 75% | 50% | 65% |

Working hours



Waste liquid amount



■ From three point of view

• • • • Working / performance , Characteristic effect , Cost performance

Working / performance

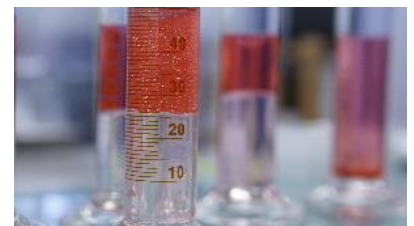
- ◇ Work can be started by adding the chemical solution **directly** to the aging developer !
- ◇ The concentration can be set according to the dirt condition and you can get the same cleaning performance **as new liquid** cleaning every time !
- ◇ **High cost performance** is achieved by reducing concentration, time, process, and amount of waste liquid !

Characteristic effect

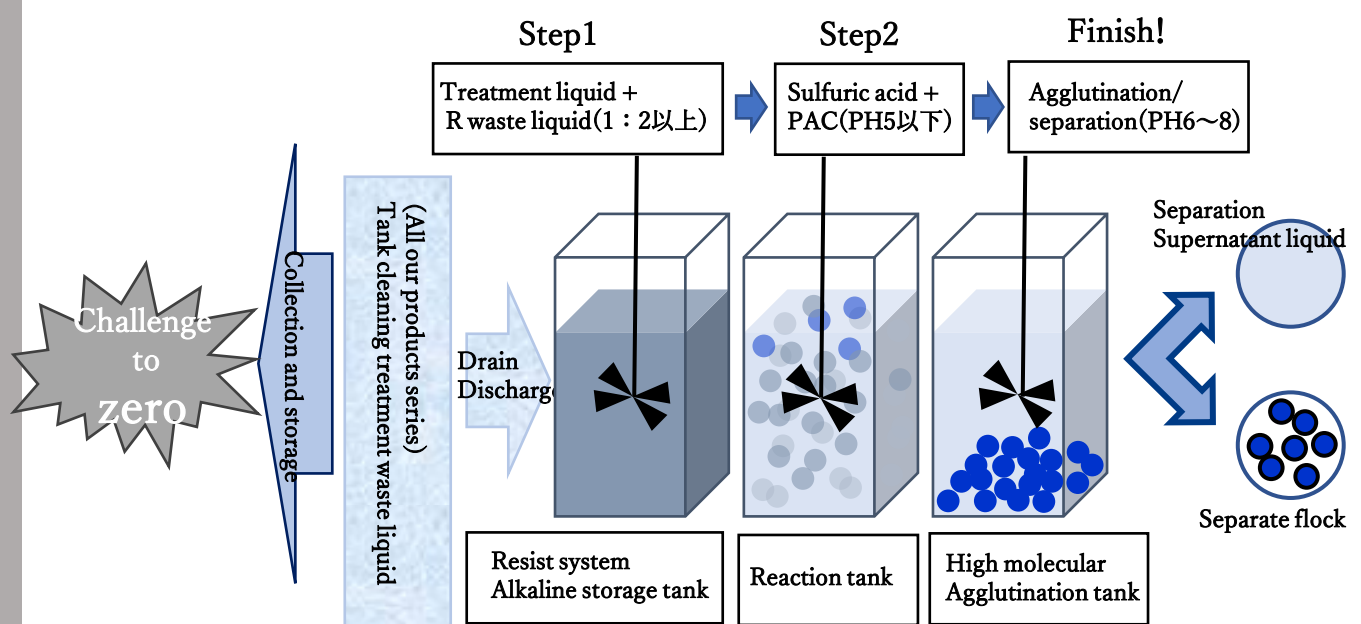
- ◇ Our original direct neutralization (**G-TRX**) technology can **prevent reattachment** of dirt and **prevent scum adhesion** !

Cost performance

- ◇ **Reduction** of industrial waste and **reduction** of development failure rate !
- ◇ Significant **reduction** in chemical cost by continuing the simple program !



■ Further prospects



- ☐ The separated supernatant is collected in a general wastewater tank.
- ☐ The separated flocs are collected in a slurry storage tank and dehydrated.

For dry film resist

Development tank / Etching tank
/ Stripping tank

Parmless Super G

- A DFR compatible tank cleaner suitable for all tanks on the DES line.
- Development tank : スーパーG + G-TRX
(Primary cleaning only)
- Etching tank / Stripping tank : Super G ⇒ Rinse agent + G-TRX

Characteristics / conditions of usage Parmless Super G

| Type | pH | specific gravity |
|----------------------------|-------------|------------------|
| Organic acidic liquid type | 2.5 ~ 3.0 | 1.020 ± 0.02 |
| Recommended concentration | Temperature | Time |
| 50v% ~ 20v% | 15 ~ 35℃ | 1.0h ~ 2.0h |

For Stripping tank /Etching tank

Rinse agent for secondary cleaning

Parmless 3000/3500A

- A rinse agent for secondary cleaning that removes salt crystals and black solids.
- Primary cleaning # Super G ⇒ Secondary rinse cleaning + G-TRX

Characteristics / conditions of usage Parmless 3000

| Type | pH | specific gravity |
|------------------------------|-------------|------------------|
| Inorganic acidic liquid type | 1> | 1.150 ± 0.02 |
| Recommended concentration | Temperature | Time |
| 20v% ~ 10v% | 15 ~ 35℃ | 0.5h ~ 1.0h |

Characteristics / conditions of usage Parmless 3500A

| Type | pH | specific gravity |
|----------------------------|-------------|------------------|
| Organic acidic liquid type | 1> | 1.120 ± 0.02 |
| Recommended concentration | Temperature | Time |
| 20v% ~ 10v% | 15 ~ 35℃ | 0.5h ~ 1.0h |

For photo solder resist

For PSR development tank only

Parmless 5600M

- Suitable for various resist inks such as green, white, and black
- Lubrication + cracking / dissolving action enables powerful cleaning against strong deposits.
- It features a two-step cleaning process.
5600M cleaning + Secondary rinse cleaning by # 3600

Characteristics / conditions of usage Parmless 5600 M

| Type | pH | specific gravity |
|-----------------------------------|-------------|------------------|
| Organic alkaline 1-component type | 14.0 ~ 13.0 | 1.120 ± 0.02 |
| Recommended concentration | Temperature | Time |
| 50v% ~ 20v% | 15 ~ 35℃ | 1.0h ~ 2.0h |

For Photo solder resist

Rinse agent for secondary cleaning

Parmless 3600

- A rinse agent for secondary cleaning to remove white solids.
- Primary cleaning # 5600M ⇒ Secondary rinse cleaning # 3600

Characteristics / conditions of usage Parmless 3600

| Type | pH | specific gravity |
|------------------------------|-------------|------------------|
| Inorganic acidic liquid type | 1> | 1.100 ± 0.02 |
| Recommended concentration | Temperature | Time |
| 20v% ~ 10v% | 15 ~ 35℃ | 0.5h ~ 1.0h |

■ Product introductions.

Applicable to all our tank cleaning products

Direct neutralizer

Pam Process G-TRX

- Improve residual defects during cleaning and completely resets dirt.
- It is possible to mixed with the resist waste liquid by adding this agent.
- In-house treatment of cleaning waste liquid is possible and improving the cleaning efficiency.

Characteristics / conditions of usage
Pam Process G-TRX

| Type | pH | specific gravity |
|----------------------------------|-------------|------------------|
| Inorganic strong alkaline liquid | 14.0< | 1.420 ± 0.02 |
| Standard addition amount | Temperature | Time |
| 25ml/L ~ 50ml/L | 15℃ ~ 35℃ | 15min ~ 30min |

Other related products

| Product | Use |
|---------------------|---|
| Palmless 3500 Aqua | Cleaning agent for various flush tanks |
| Palmless 3500 Accel | Soft etching tank cleaning agent |
| | Water-soluble flux tank cleaning agent |
| Palmless 5700 | Special cleaning agent for PSR development tank |
| Palmless 3800 | Cleaning agent for plate cleaning equipment |

THREE PALMS P&A



Contact for Information

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