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.

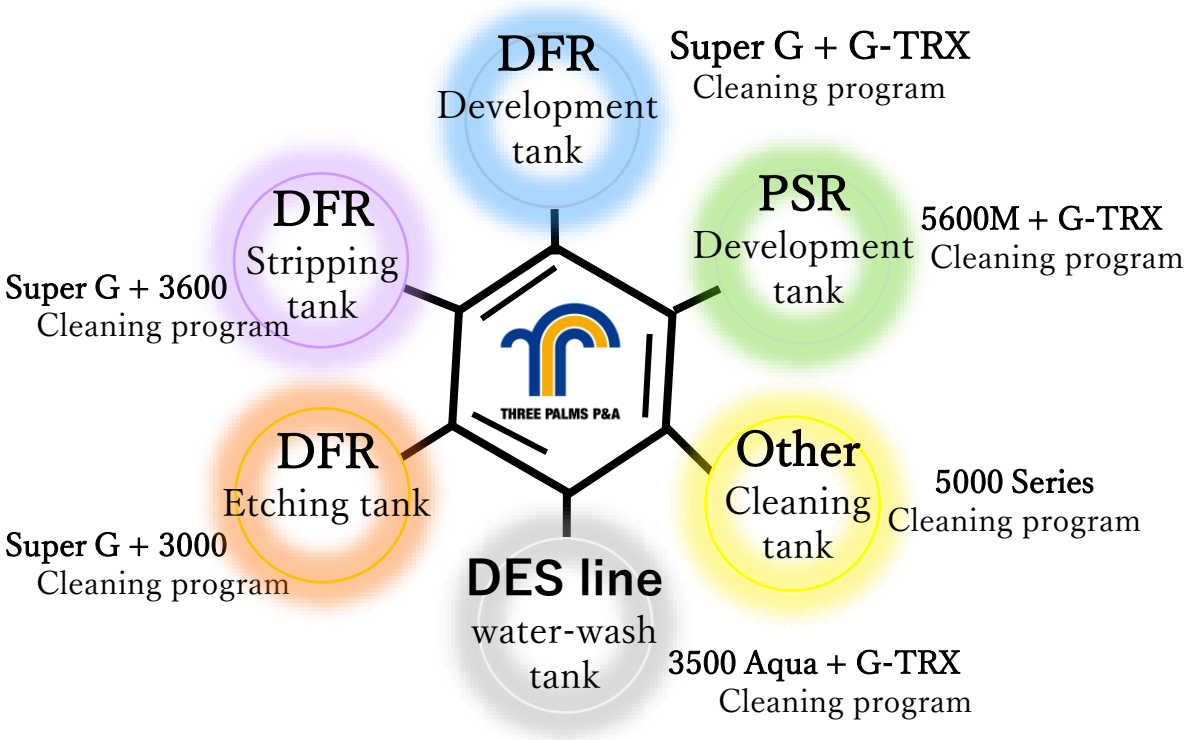
ⅲ） We have achieved a simple cleaning program and developed a direct neutralization cleaning method as an original technology.

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 program !

■ Correlation between corresponding process of our product and the cleaning program



For development tank cleaning / striping tank cleaning

The simple cleaning program is **the best way !!**

To new customer adopting our product !

The First cleaning program

To

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 , striping 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.

Overview of our series products and applicable processes / recommended cleaning programs

DFR development tank Super G Cleaning Program

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

DFR development tank The first cleaning program List of processing conditions

Drain the developer → Super G Preprocessing → Main cleaning Super G → Direct neutralization G - TRX → Washing with water (High pressure + pooled water) → Completed

Time required： The whole process **6~8 Hour**

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

DFR development tank The simple cleaning program List of processing conditions

Add Super G to development solution 4 : 1 → Main cleaning Super G → Direct neutralization G - TRX → Washing with water (High pressure + pooled water) → Completed

Time required： The whole process **3~4 Hour**

In addition・・・・・

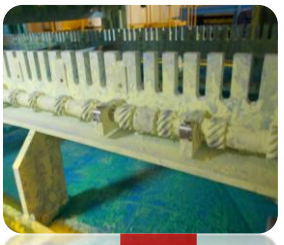
■ Super G **supports** a variety of programs ！
■ **Can choose** usage for you needs！

☐ 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

DFR stripping tank Super G + 3600 Cleaning Program

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

Primary cleaning **Start**

Drain the striper → Super G Preprocessing → Primary cleaning Super G → Direct neutralization G - TRX → Simple Washing with water → Disposal

Rinse cleaning **Start**

3600 Rinse Preprocessing → Rinse cleaning 3600 → Direct neutralization G - TRX → Washing with water (High pressure + pooled water) → Completed

Time required： The whole process **6~8 Hour**

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

Primary cleaning **Start**

Drain the striper → Super G Preprocessing → Primary cleaning Super G → Direct neutralization G - TRX → Simple Washing with water → Disposal

Rinse cleaning **Start**

3600 Rinse Preprocessing → Rinse cleaning 3600 → Direct neutralization G - TRX → Washing with water (High pressure + pooled water) → Completed

Time required： The whole process **3~4 Hour**

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

PSR developing tank「5600M + 3600 Rinse Cleaning Program」

The First cleaning program

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

・・・ Complete reset of White crystals.

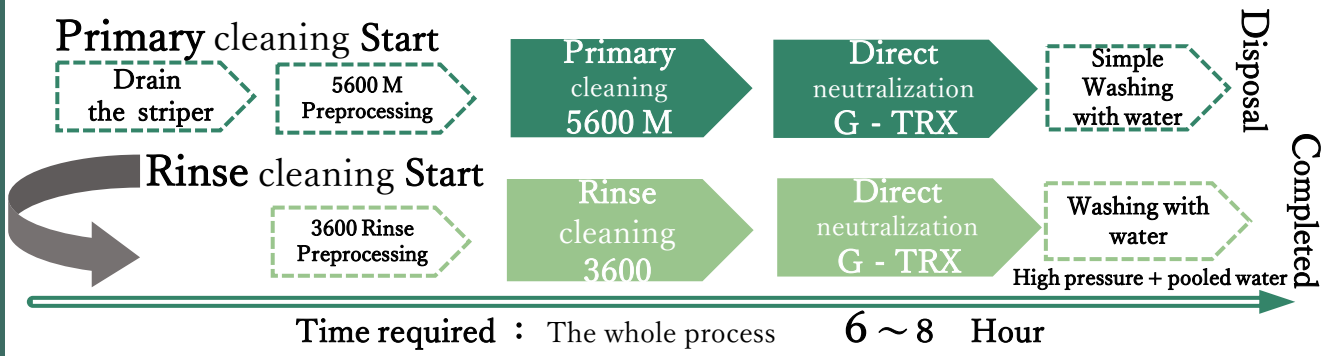
■ The resist component is dissolved and swelling by the primary cleaning.

■ 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



Time required ： The whole process 6～8 Hour

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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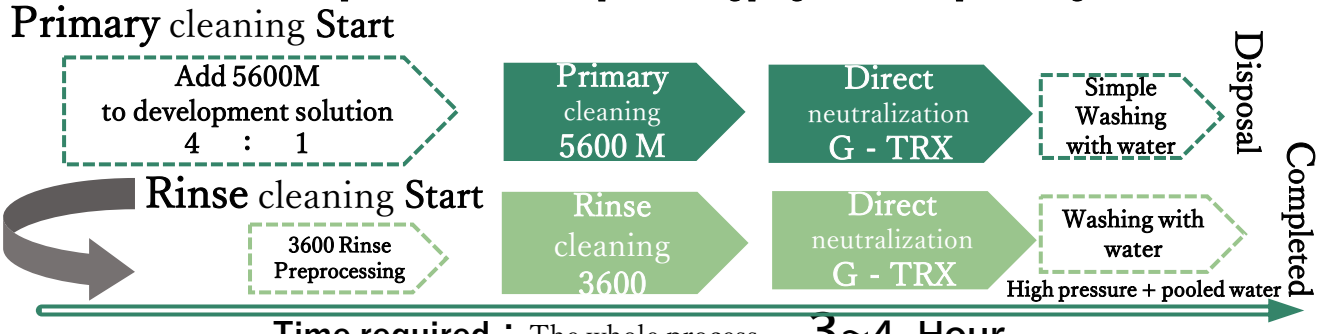
PSR development tank The simple cleaning program List of processing conditions



Time required ： The whole process 3~4 Hour

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

In addition・・・・・

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

☐ I want to reuse the stock solution.

☛ **Multiple cleaning is possible**

by recycling for cleaning, collection and re-cleaning.

■ **Can choose** usage for you needs！

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

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

Dry film development tank Cleaning

■ 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!**

Introduction of voices from users !

Introduction of voices from users !

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.

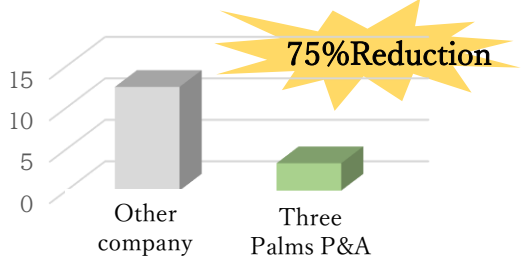
Product selection	As it is highly diversity, **just** make a selection for **DES or PSR**
Product capabilities	The effect lasts for a **long time** due to the excellent cleaning ability and the introduction of simple cleaning.
Operation method	No liquid deterioration due to simple cleaning during the 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 .

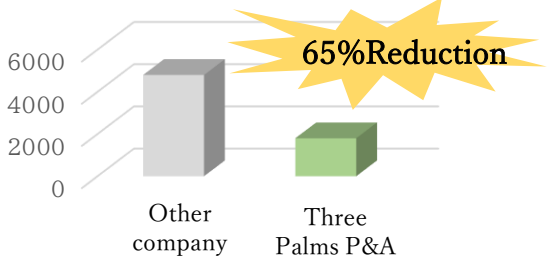
Advantages of introducing a simple program calculated from the required time and the amount of waste liquid.

	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



What's the characteristics and effects of "Cleaning Revolution !

■ 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 ！

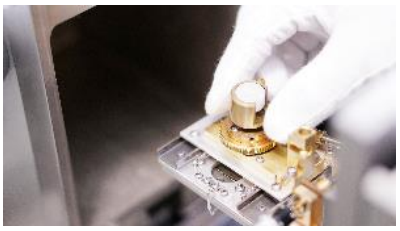
Characteristic effect

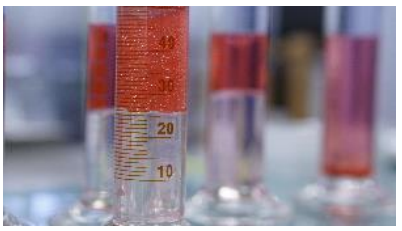
◇ Our original direct neutralization (**G-TRX**) technology can **prevent reattachment** of dirt and **prevent scum adhesion** ！

Cost performance

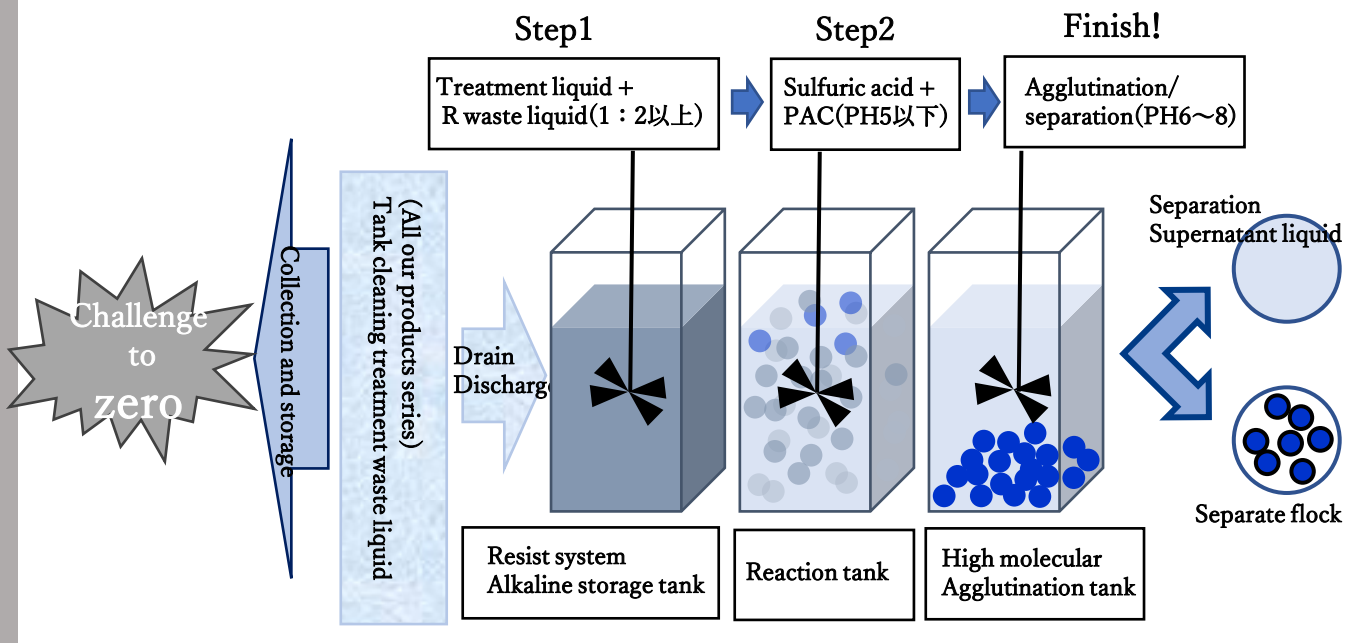
◇ **Reduction** of industrial waste and **reduction** of development failure rate ！

◇ 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 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 Stripping tank /Etching tank

Rinse agent for secondary cleaning

Plmless 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

Rinse agent for secondary cleaning

Plmless 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 !

■ 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

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