



# Company Profile

2018.07.24

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## Locations of SKP

### Head Office & Factory

726 Bosung square knowledge industry center  
#323 Somanggongwon-ro Siheung-si Gyeonggi-do Korea

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[www.skpchem.com](http://www.skpchem.com)



Vincent, Lee

### PROFESSIONAL EXPERIENCE

**SKP CEO : Vincent, Lee**

- ❖ **CEO of SKP : July -2010 - present**
- ❖ **SK energy & OilBank Refinery operation Dept. 13 years**
- ❖ **Chemical develop & research : 10 years**
  - ✓ Semiconductor parts cleaning technology
  - ✓ Fine chemical develop Dept.
- ❖ **CEO of INNOROOT : 5 years**
  - ✓ Developed of Si etchant & equipment
  - ✓ Developed of glass etchant & equipment
- ❖ **Oriental Brewery : expansion Dept. 3years**



### Cleaning Agent

We supply and develop fine chemical products optimized for the needs of customers in all industries.



### Equipment Cleaning

It is possible to remove deposits to cooling devices such as petro-chemical plants and oil refineries without damaging the materials, and to perform cleaning work during operation. (On-line cleaning or CIP cleaning)



### Parts Cleaning

We provide the fine chemicals and cleaning methods for parts and equipment in all industries

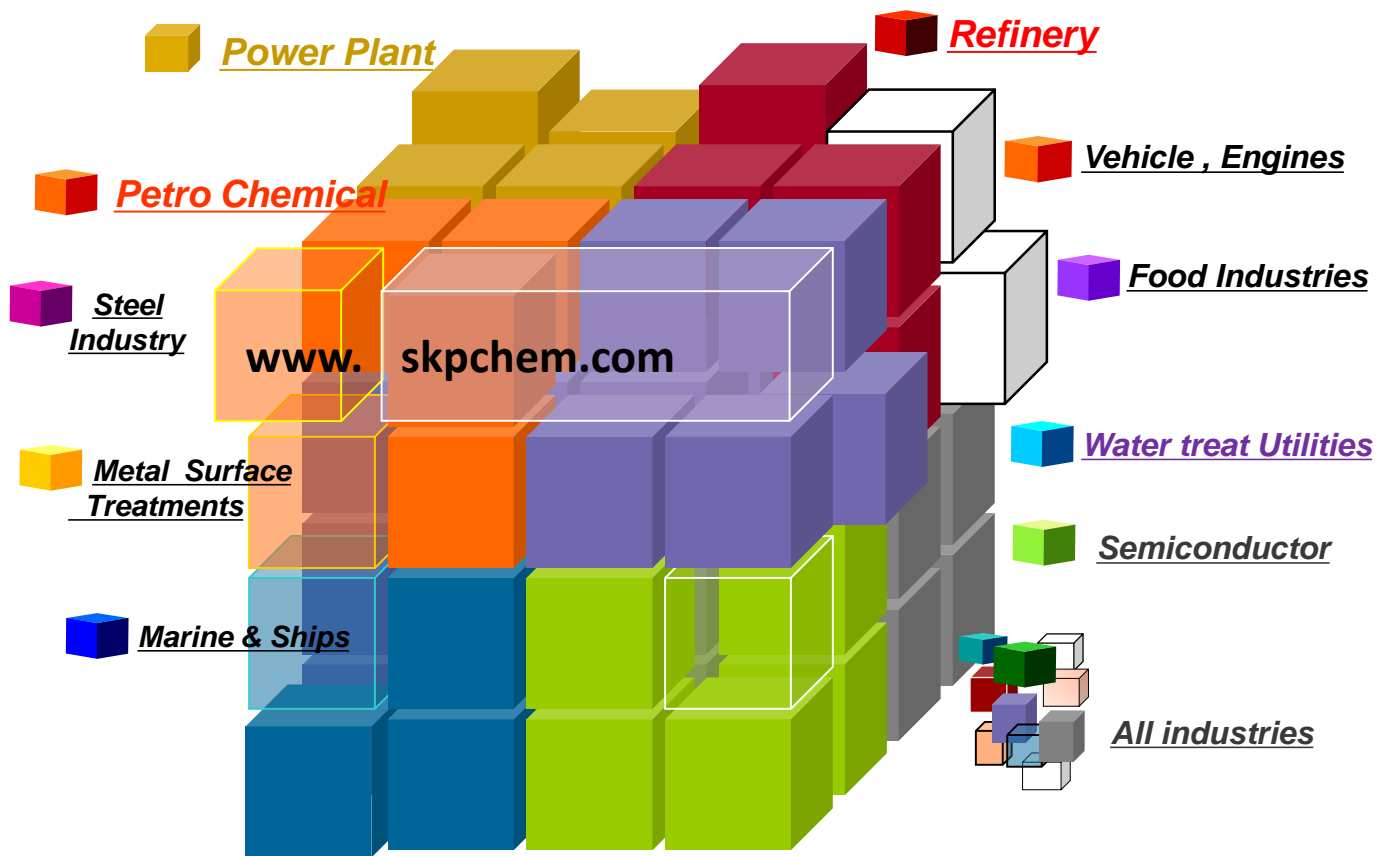


### Special Etchant

We develop and provide surface treatment chemicals for all kinds of metals. etchant, chemical polishing, deburring

*Best Partner with Excellent Chemical Solutions !!  
Things go better with **skp** fine chemicals!!*

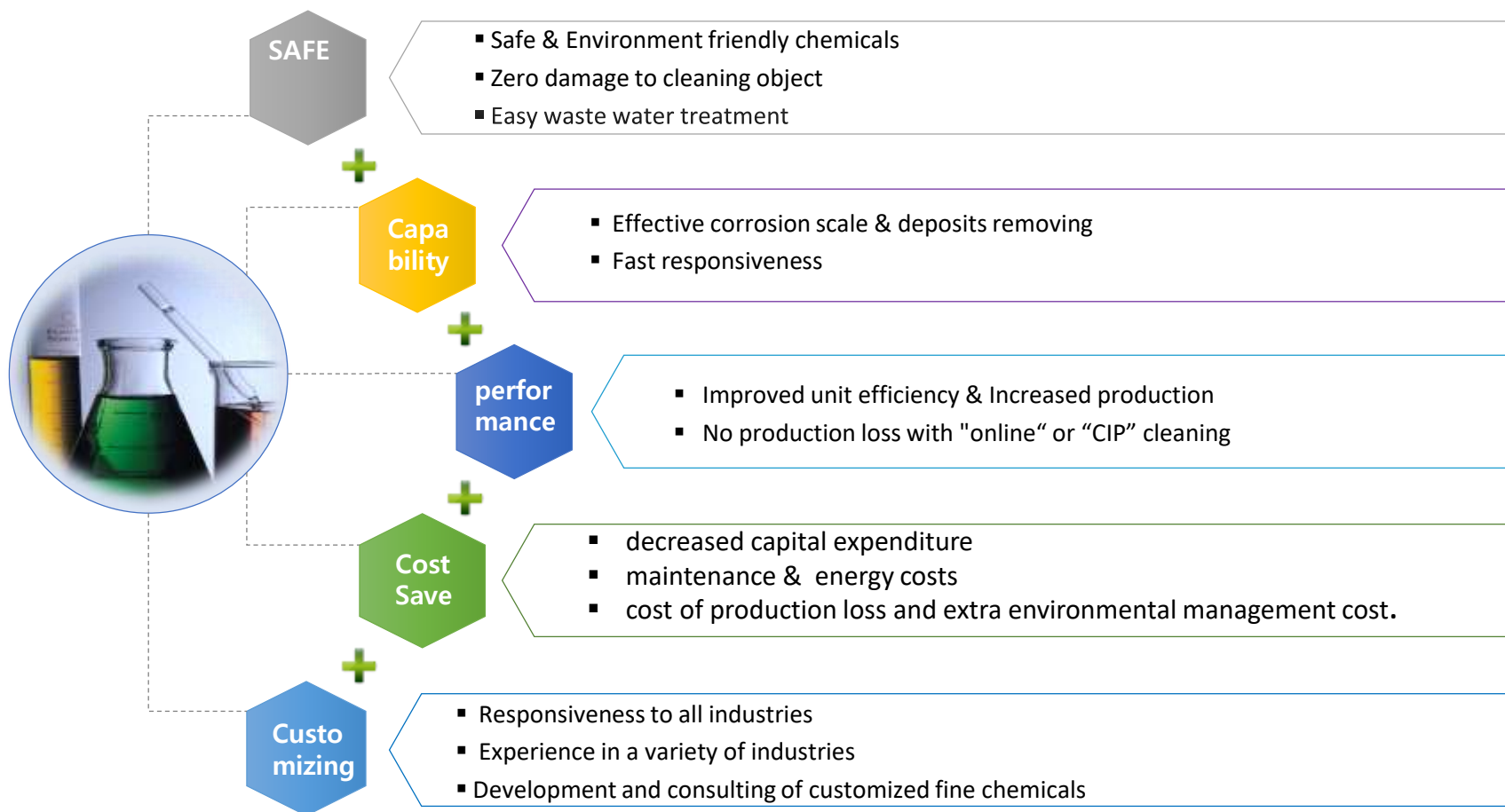
## APPLICATIONS INDUSTRY



❖ Exchanger, Filter, Piping, Equipment, Parts etc.

With ECOS solution, Taking care of your process !!

SKP Chemical is a company that develops and supplies fine chemical products suitable for each process in all industries based on its long experience and practical application experience. It is a precision cleaning method for the maintenance of parts and equipment of each process.







Identify the status of worksite

Check cleaning work condition

Analysis of samples

Sampling and component analysis  
If necessary, chemical development

Planning of cleaning project

Selection of cleaning agent and cleaning method  
Chemical consumption, cleaning period and contract

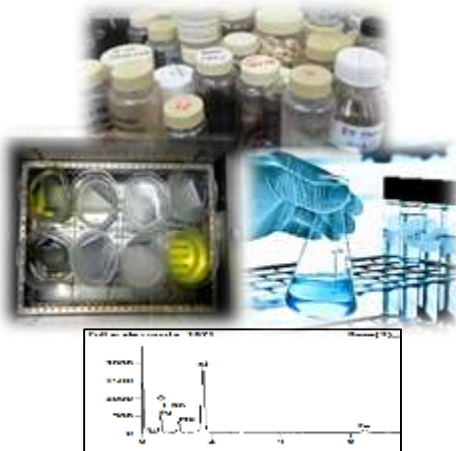
Perform cleaning work

Safety and Environment First

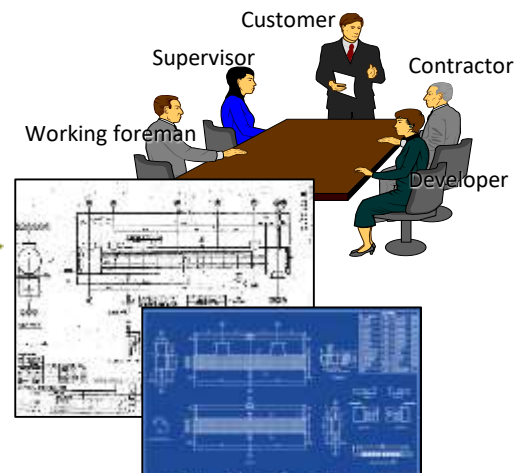
Approve results and reporting

Approval of cleaning result  
and submit report

Identify the status of worksite



Analysis of samples



Planning of cleaning project



Approve results and reporting



Perform cleaning work

- **Particulate fouling (*Solidification , crystallization*)**

Heavy particles settle on a horizontal surface due to gravity and fine particles settle onto heat transfer surfaces due to suction force or other mechanisms. Examples of particulate fouling are unburned fuels or ashes deposition on boiler tubes, dust deposition on air cooled condensers etc.



▷ accumulation of ash on furnace inner tube



After cleaning



▷ deposits accumulated on air cooled fin tube



After cleaning



▷ After cleaning



After cleaning

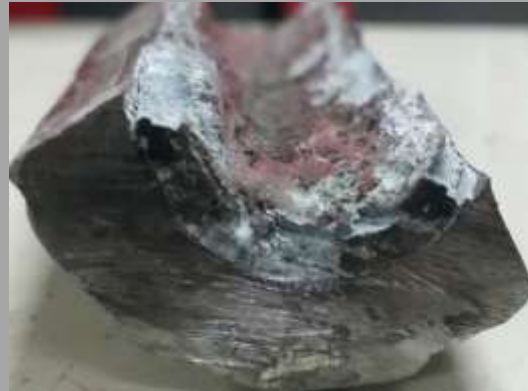


### ▪ Precipitation fouling

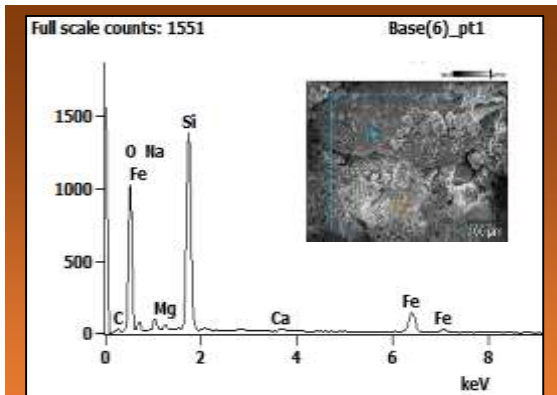
Super-saturation takes place in the inorganic salts dissolved during heating or cooling. Undissolved salts such as calcium and magnesium sulfate, carbonate, silicate and the like have less solubility in warm water to a certain temperature than cold water and precipitate on the heat transfer surface.



▷ Rupture of tube by local overheating



▷ Scale of inner wall of boiler tube



▷ Scale of silicate rich component

*The mineral scale deposited on the surface of the heat exchanger causes continuous and serious problems in many types of equipment, including desalination due to process industries, cooling water systems, steam generators, and evaporation.*

- **Chemical reaction fouling (crystalline precipitation)**

This type of fouling occurs when a precipitate is formed as a result of a chemical reaction that results in the formation of a solid phase at the surface. This type of fouling is very powerful and requires special chemical measures to clean the deposits on the surface of the heat exchanger and provide sufficient operating life



▷ before and after cleaning of scale on tube side



▷ before and after cleaning of Brazing HE



▷ before and after cleaning the front surface of PHE



▷ before and after cleaning scale on chlorinator cell

- Corrosion fouling

Corrosion fouling is also caused by chemical reactions, which are the reactants and material consumed. Corrosive products can foul the surfaces if they are not soluble in solution after formation. In some cases, corrosion products may be swept downstream of the process loop and cause surface sedimentation.



▷ appearance pipe thinned by corrosion and corrosion deposit on the pipe inner wall



▷ Pipe thickness is thinned by corrosion, and pinhole is accrued



### ▪ Accumulation of biological fouling

The growth of biological material on the heat transfer surface means that biological microorganisms and macroscopic organisms stick to the heat transfer surface. Growing microorganisms ( eg, algae, bacteria, fungi, etc.) and their products cause microbial contamination. Seaweed, aquatic plants and shells cause microbial contamination.

Examples of biofouling occur packed bed of cooling tower, power plant condensers using seawater.



▷ Moss growth of the cooling tower packed bed



After cleaning



▷ Shellfish inside the sea water cooler tube and pipe



After cleaning



▷ Shellfish inside the sea water cooler tube and pipe



After cleaning



### Oil sludge & sediment fouling

In the case of heavy oil heat exchangers or filters, materials such as tar components or oil sediments cause fouling on the heat front or in narrow gaps, severely reducing the efficiency of the device. This is difficult to remove with common flushing oil (eg, diesel). Furthermore, denatured polymer oils, or oil sediments matted with oil and mud, must be treated with high-performance emulsion cleaners.



✓ Oil sediments on Compa Block



After cleaning



✓ Heavy Oil Screen filter



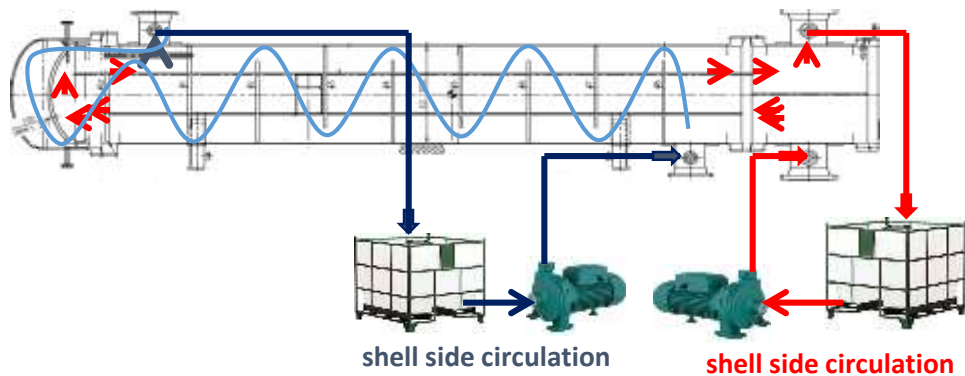
After cleaning



✓ Lube oil puri-heater for engine



After cleaning



➤ Shell & tube HE Circulation cleaning

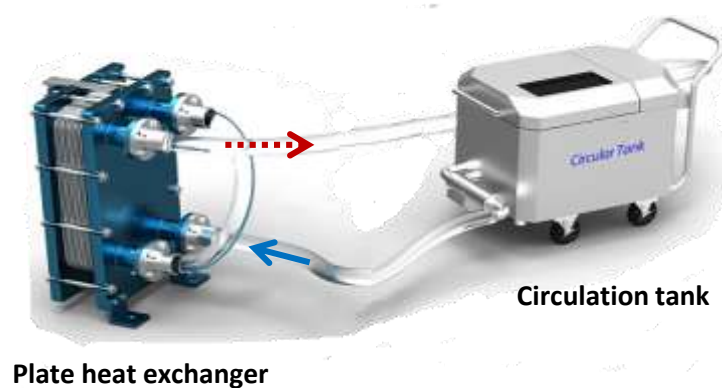
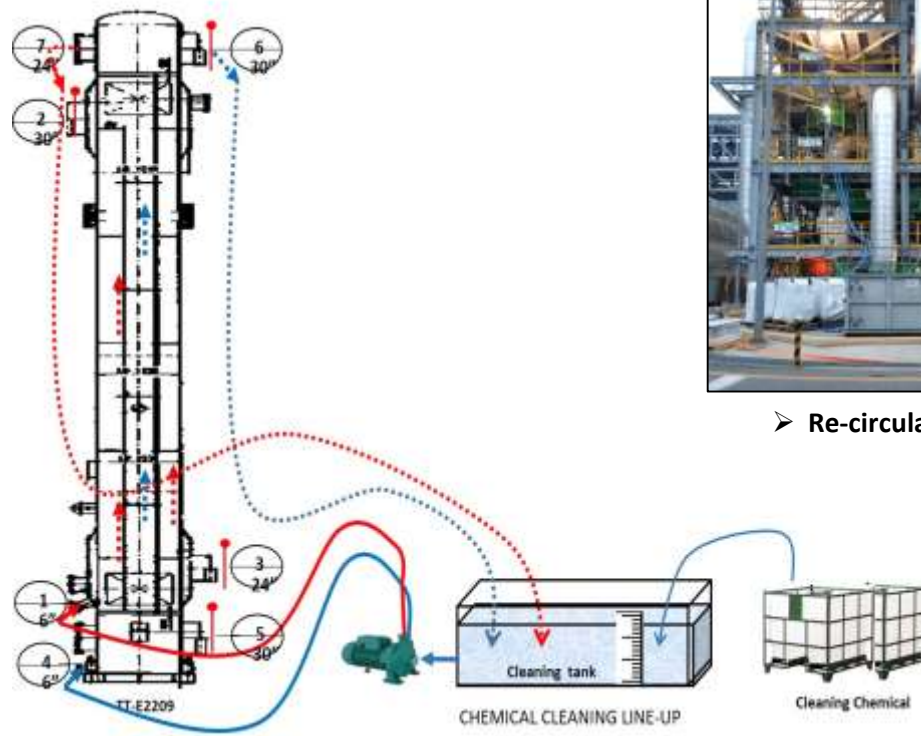


Plate heat exchanger

Circulation tank



➤ PHE Circulation cleaning



➤ Re-circulation cleaning

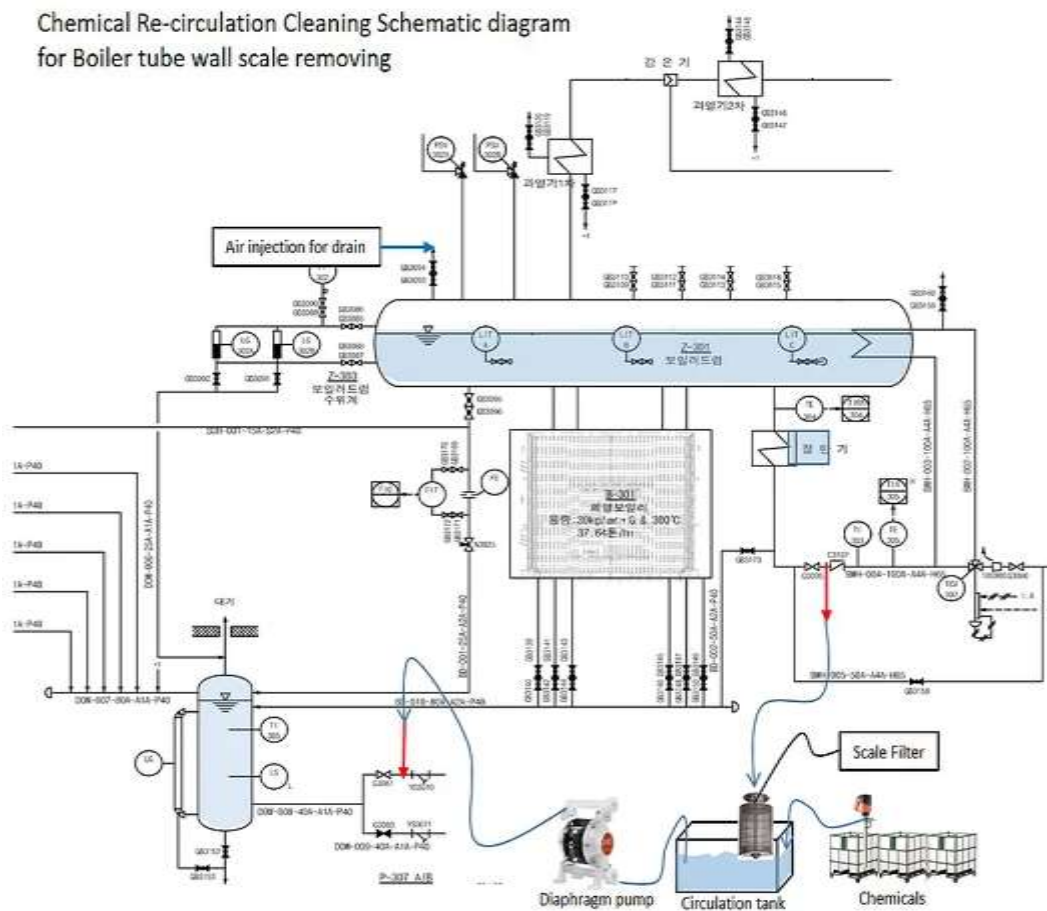


➤ Hose connection for circulation





Chemical Re-circulation Cleaning Schematic diagram  
for Boiler tube wall scale removing



➤ Hard scale on boiler inner tube wall



➤ Hose connection for circulation



➤ Re-circulation cleaning





❖ Shell &amp; tube exchanger



❖ Fin tube cooler bundle



❖ Parts dip in ultra-sonic



➤ Air cooler bundle took out



➤ Moving to cleaning tank



➤ Setting on cleaning tank



➤ Bubble cleaning



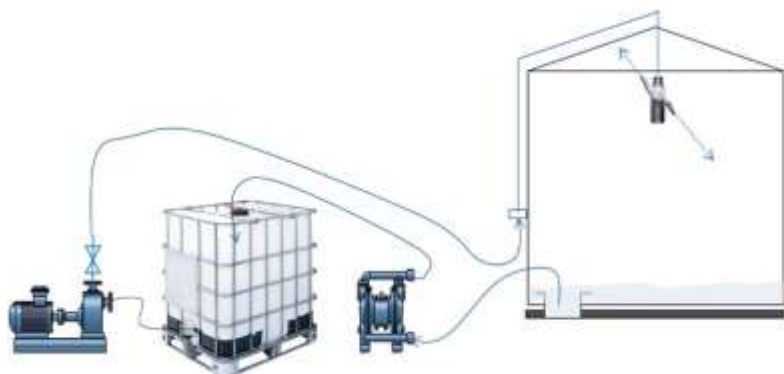
❖ pickling tank



❖ Stainless vessel pickling



❖ Vessel for petro chemical



Storage tank spray &amp; circulation cleaning



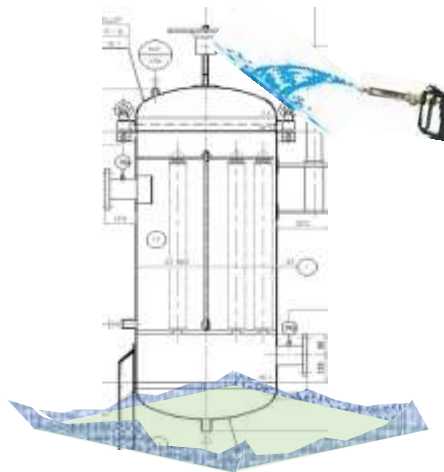
➤ Auto spray nozzle (360°)



➤ Storage tankage



Tank internal spray cleaning



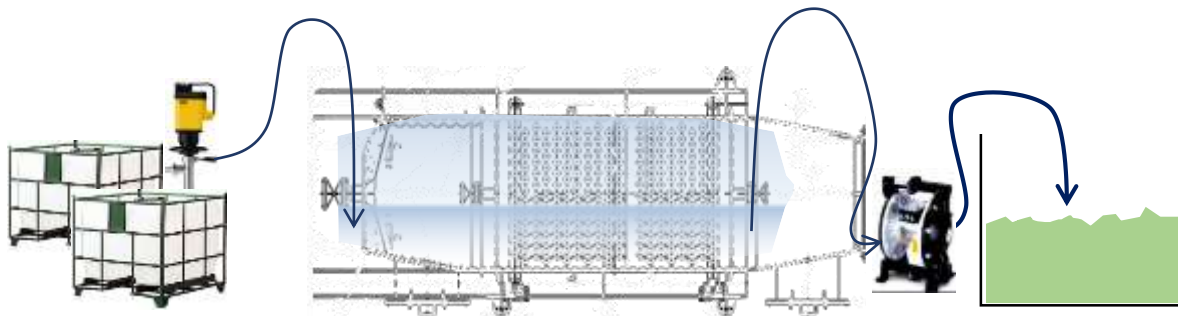
Tank external spray cleaning



➤ Tower internal cleaning



➤ Vessel outer cleaning



❖ Chemical fill-up & scale dissolving



❖ Economizer scale removing



❖ Chemical filling pump



❖ Fill up to vessel

- ✓ ***Power Plant***
- ✓ ***Refinery***
- ✓ ***Marine, Ship***
- ✓ ***Petro Chemical***
- ✓ ***Vehicle***
- ✓ ***Steel Company***
- ✓ ***Rail Way Vehicle***
- ✓ ***Food Industry***
- ✓ ***Precision parts***
- ✓ ***Rusty parts***
- ✓ ***Metal surface treatment***
- ✓ ***Wafer & Display***





➤ Cleaning plan



➤ Chemical &amp; water fill-up



➤ Circulation



➤ Dissolving



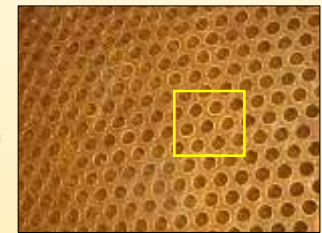
➤ Final cleaning &amp; rinse



✓ Shellfish inside the sea water cooler tube side



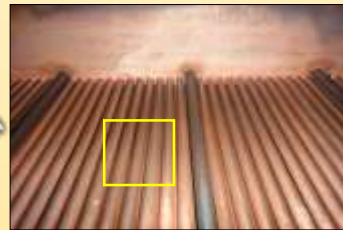
✓ tube side : Before



✓ Tube side : After



✓ Shell side : Before



✓ Shell side : After

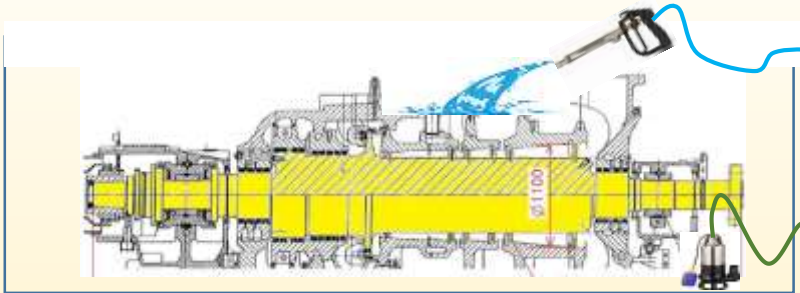


Enlarged view



Enlarged view

- ❖ CCW HE (Vol: 15M3) of the power plant is a heat exchanger that cools the cooling water with seawater. Shellfish is attached to the tube side and water scale is attached to the shell side. The material of the tube bundle is Al-brass, and SKP chemical dissolves the scale without any damage to the metal.



**1<sup>st</sup> step** : Degreasing agent spraying

**2<sup>nd</sup> step** : Air Drying

**3<sup>d</sup> step** : Anti Rust treatment

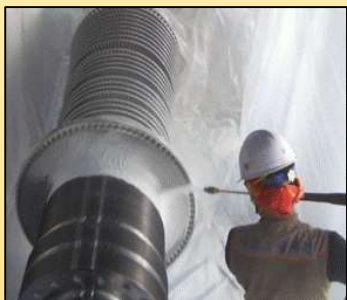
- ❖ The new Steam Turbine Rotor should be installed after removing the process oil and anti-rust oil prior to installation. To remove this oils, a non-volatile, odorless, water-based detergent should be used instead of organic solvents. It is particularly important to use a suitable detergent that does not rust after cleaning.



✓ Cleaning of 550 MW HP/LP Rotor & parts for KOMIPO



✓ After degreasing of HP & LP Rotor



✓ 125 MW HP/LP Rotor & parts for GS ENR



✓ Degreased Rotor





✓ Filter Housing



✓ Filter module



✓ Fouled filter elements



✓ Disk element



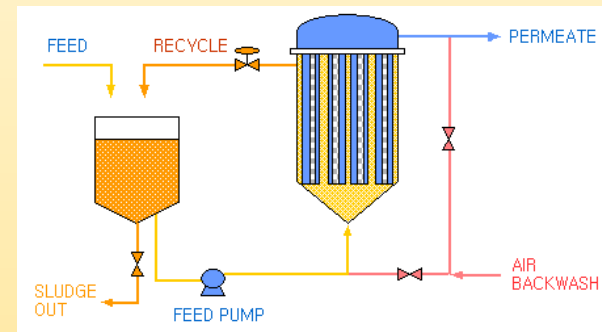
✓ Microscope view



✓ Before cleaning



✓ After cleaning



- ❖ The prefilter removes the suspended solid contained in the condensate. The object to be removed is a metallic oxide sandwiched between the disk element grooves. This does not remove well in aqueous hydrochloric acid solution, and may damage the unit. A suitable cleaning agent is required to effectively remove oxides



❖ **Chlorinator & Desalination Cell cleaning**  
(mineral scale deposits on cell)



✓ *Before cleaning*



✓ *After cleaning*



✓ *After cleaning*



❖ **Air Cooled condenser**



✓ *Before cleaning*



✓ *After cleaning*





➤ Steam and air injection lines are equipped with a cleaning tank



➤ Dipping to cleaning bubble tank



➤ Heating & bubbling



➤ Rinsing



✓ Top view finned tube (Before)



✓ Top view finned tube (After)



✓ Side view finned tube (Before)



✓ Side view finned tube (After)



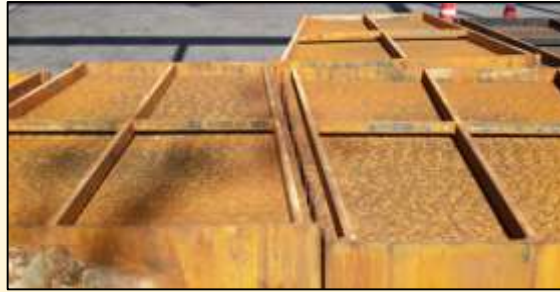
#### ❖ Cleaning Method

Organic matter such as carbon deposited to fin tube by organic vapor. In such a fouling, the cleaning liquid must be heated and flowed for a long time to be cleaned.

카본과 같은 유기물이 유기증기에 의해 핀튜브에 고착된 모습. 이와같은 파울링은 세정액은 가온 및 유동을 주어 장시간 세정을 시행해야 한다.



✓ **Combustion air pre-heater modules**



✓ **compression refrigerator**



✓ **Compressor inter & after cooler**



✓ **Oil air coolers**



✓ **Lube Oil system**

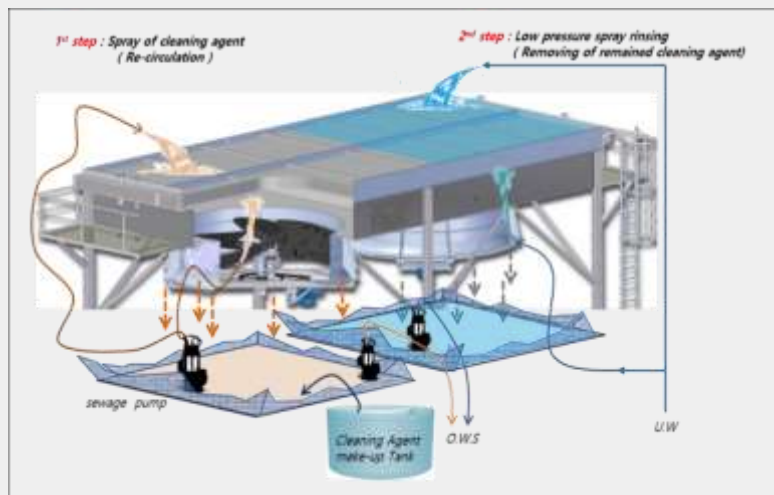


✓ **Steam Condenser**



✓ **Enlarged view of titanium tube**





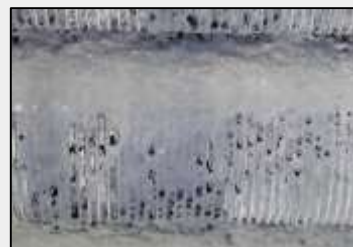
➤ Schematic of cleaning method



✓ Before cleaning



✓ After cleaning



Enlarged view



✓ Air fin fan coolers



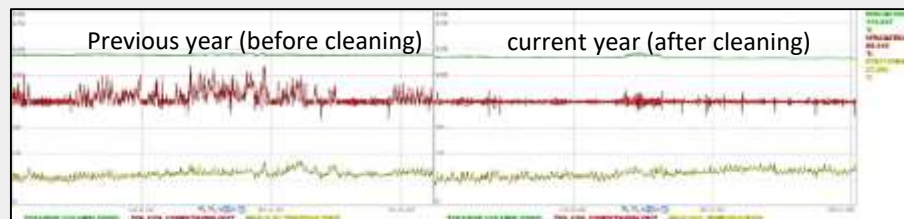
✓ Top side cleaning



✓ Water pool for circulation



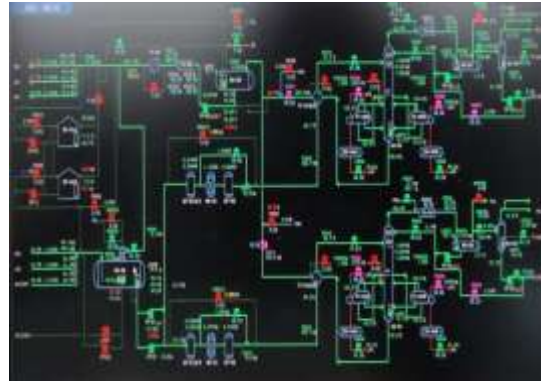
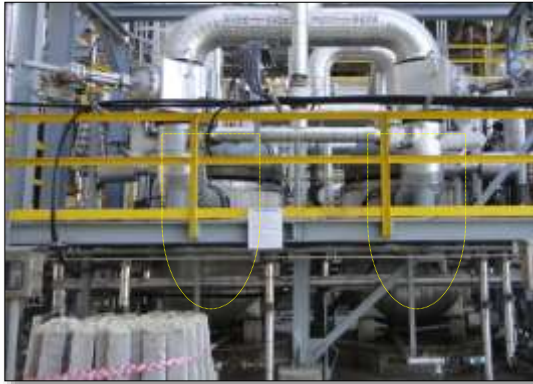
✓ Bottom side cleaning



✓ Temperature trend after cleaning



For more details, please visit our website : [www.skpchem.com](http://www.skpchem.com)



❖ *Amine filters are obscured by oil scum, iron oxide, and pyrophoric iron sulfide, and the replacement time is confirmed by the increase of differential pressure. By cleaning deposit and reusing them, the use of expensive filters is significantly reduced.*



➤ **Filter hosing**



➤ **Insert to cleaning tank**



➤ **Cleaning system**



➤ **Bubble cleaning**



➤ **Hot water washing**



➤ **Final rinsing**



*For more details, please visit our website : [www.skpchem.com](http://www.skpchem.com)*



✓ **Before cleaning**

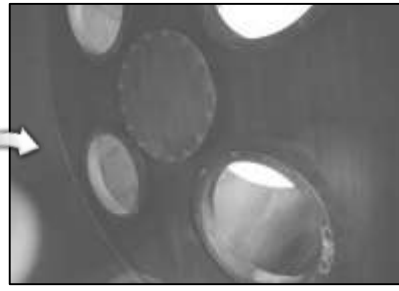
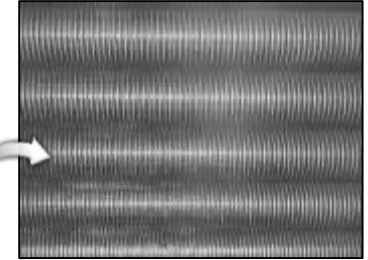


✓ **After cleaning**



✓ **Various types of amine filters**







❖ Chemical cleaning equipment



➤ Connection of circulation hose and spool



➤ Dissolved Scales



➤ Plugged Oil Pipe line



✓ Fouled oil pipe inner wall



✓ After circulation cleaning

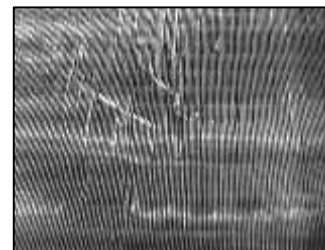




➤ Circulation cleaning



➤ Spray cleaning



✓ Top view (Before)



✓ Top view (After)



✓ Tube side (Before)



✓ Tube side (After)



➤ Dipping cleaning



➤ Spray cleaning



✓ Top view (Before)



✓ Top view (After)



❖ Engine Oil purifier pre-heat HE



✓ Before cleaning



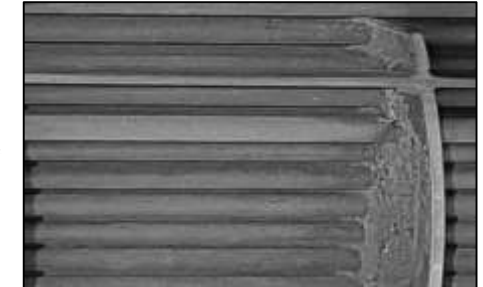
✓ After cleaning



❖ Cooler



❖ Shell &amp; tube exchanger



✓ After cleaning



✓ After cleaning

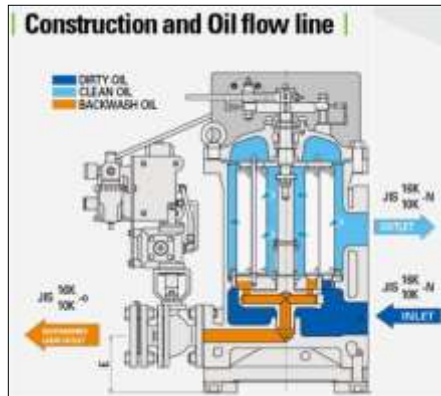


❖ Pump casing



✓ After cleaning

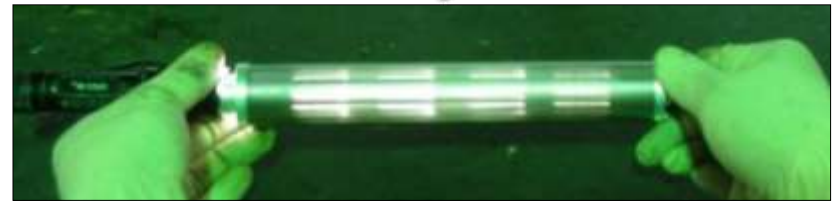




➤ Ultra sonic cleaning



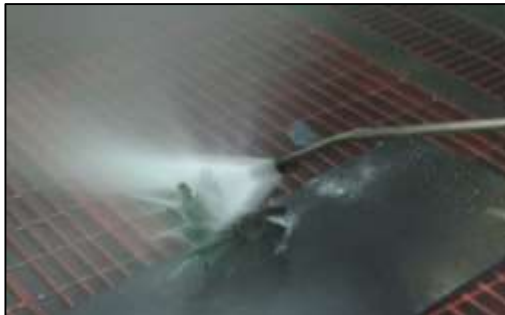
❖ Notch wire filter housing & north type filter elements



➤ Spindle Guide



➤ Fuel Injector

✓ *Before cleaning*✓ *After cleaning*➤ *Engine Parts cleaning by ultra sonic*➤ *High pressure spraying*✓ *Before cleaning*✓ *After cleaning*





✓ Oil cooler Before cleaning



✓ After cleaning



✓ Top view



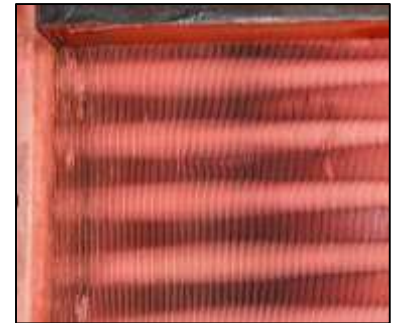
✓ Side view



❖ Inter Cooler



✓ Before cleaning



✓ After cleaning



✓ Before cleaning



✓ After cleaning







❖ Freezer leak refrigerant side cleaning



✓ Before cleaning

✓ After cleaning



❖ Freezer cooling water side cleaning



✓ Before cleaning

✓ After cleaning



❖ Air Cooler Cleaning (copper alloy)



➤ Circulation spray method



➤ Spray of top side

- ❖ The Air Fin tube cooler Bundle can be cleaned completely by spraying or dipping, without damage to the substrate.
- Applicable material: Aluminum or copper alloy



✓ Before cleaning



✓ After cleaning



➤ Hard scale on finned tube



➤ Loosed scale by chemical

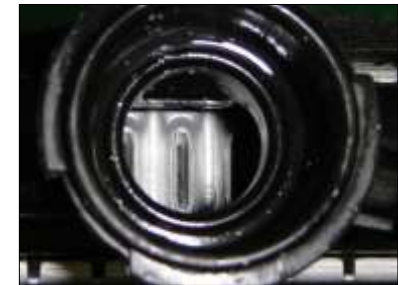


➤ Cleaned finned tube





➤ *Automotive Radiators (aluminum)*

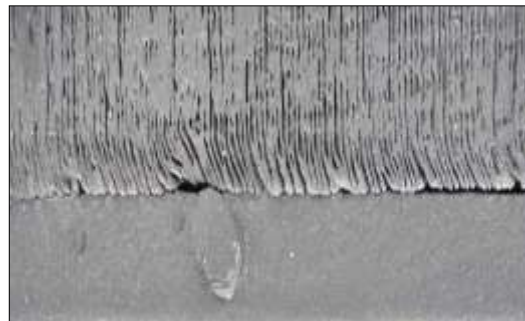


✓ *Before cleaning*

✓ *After cleaning*



➤ *Locomotive radiator (copper alloy)*



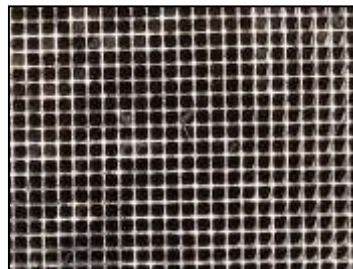
✓ *Before cleaning*

✓ *After cleaning*

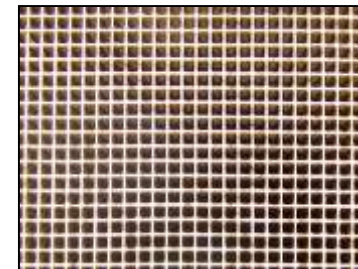




❖ DPF of 25.5t truck



✓ Before cleaning



✓ After cleaning



✓ Before cleaning



✓ After cleaning



❖ Engine piston



➤ Ultra-sonic cleaning



✓ Before cleaning



✓ After cleaning

➤ *Spray Cleaning*➤ *Rinsing*❖ *Gas cooler*✓ *Before cleaning*✓ *After cleaning*❖ *Gas cooler*✓ *Before cleaning*✓ *After cleaning*





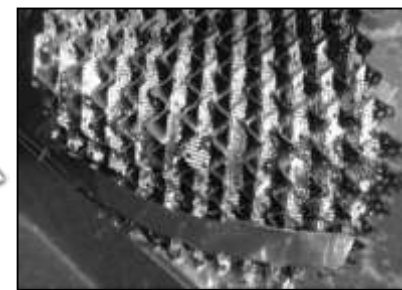




✓ Melar pack



✓ Before cleaning



✓ After cleaning



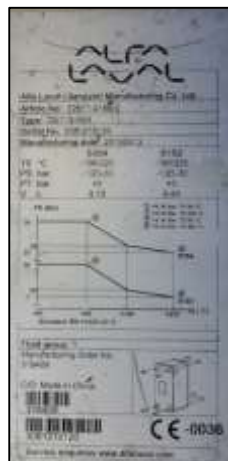
✓ Enlarged view



✓ Before cleaning



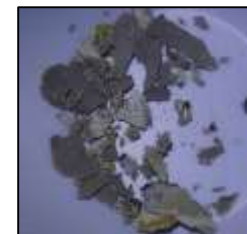
✓ After cleaning



❖ Fouled brazing HE



➤ Re-Circulation scale removing agent



✓ Scale sample



✓ Dissolved scale



✓ Before cleaning



✓ After cleaning



✓ Enlarged view



✓ Enlarged view

## ❖ iron oxide scale deposition case



✓ Before cleaning

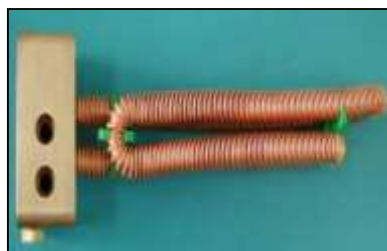


✓ After cleaning

The mineral scale contained in the cooling water accumulates on the heat transfer surface and the cooling function is lost. This is the cleaning result that the heat exchanger is restored to the initial function.

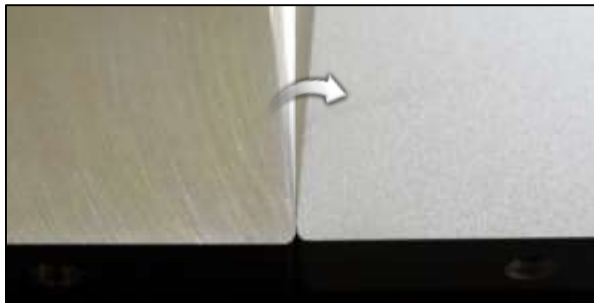
냉각수에 포함된 미네랄 스케일이 열전달 표면에 쌓여, 냉각기능을 상실한 상태이며, 본 열교환기를 초기의 기능으로 회복시킨 세정 구현 결과입니다.











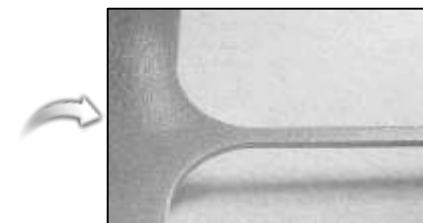
✓ Aluminum tool-mark removing



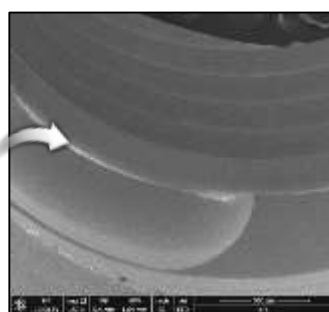
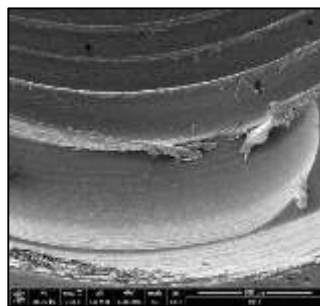
✓ Aluminum tool-mark removing



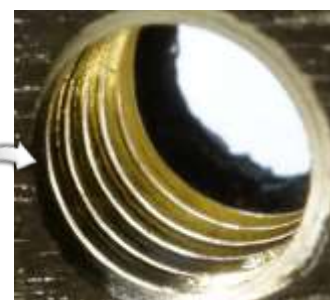
✓ Bone plate tapped hole burr removing



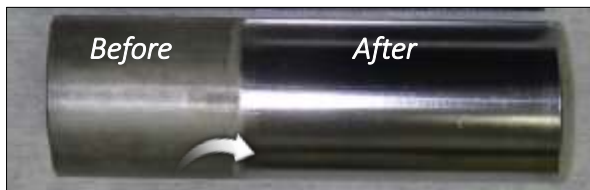
✓ Invar laser cut burr removing



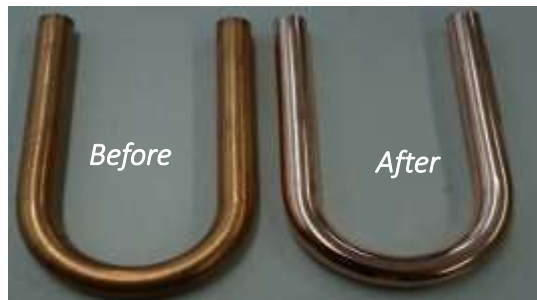
✓ Bone plate tapped hole burr removing



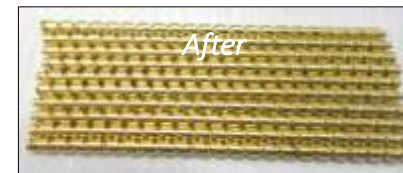
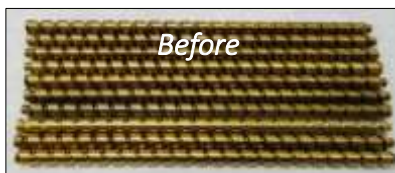
✓ Brass tapped hole burr removing



✓ Polishing of carbon steel



✓ Copper alloy polishing ( like mirror surface)



✓ Copper alloy polishing &amp; coloring (Gold)







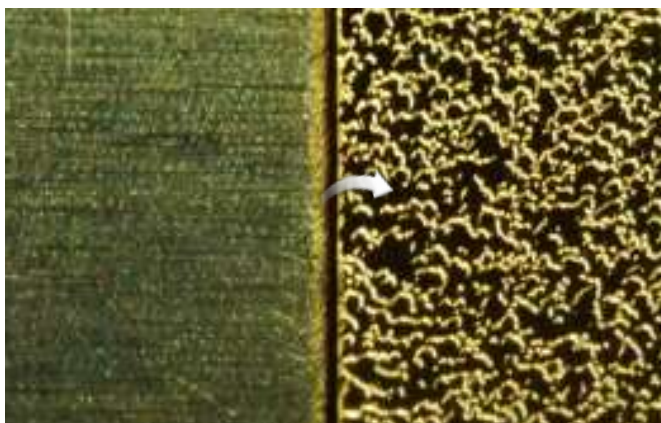
✓ Brass accessory surface polishing



✓ Brass necklace chemical polishing



✓ Brass accessory surface polishing



✓ Brass sheet texturing



✓ Brass sheet mirror polishing



✓ Etching Module



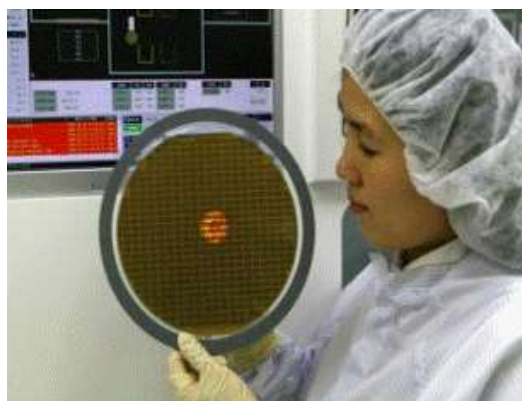
✓ Etching



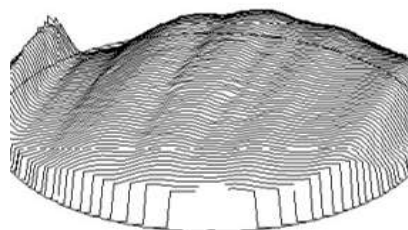
✓ Rinse



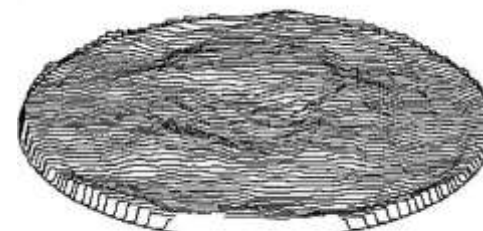
✓ Ultra-thinned wafer



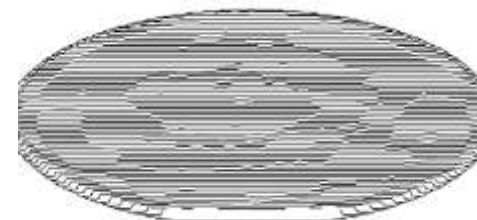
✓ Patterned wafer : 150 to 50um



✓ Sliced wafer



✓ Wave surface



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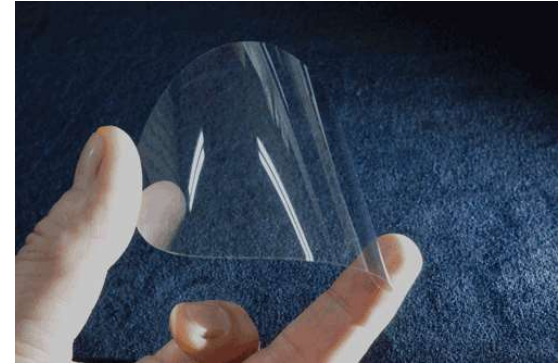




✓ Ultra-thinned glass (5G)



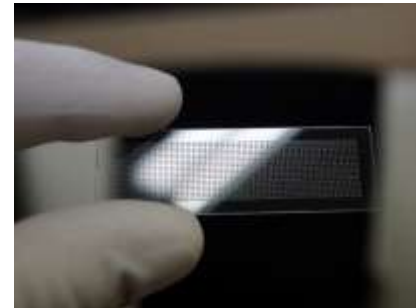
✓ Ultra-thinned glass (2G, thickness:30um)



✓ Thin glass shaping



✓ Patterned glass



✓ TGV ( through glass via for semiconductor device)



For more details, please visit our website : [www.skpchem.com](http://www.skpchem.com)





*Thank you for your attention !*