

# Slurry/Chemical Mixing Delivery System

- **POU mixing system**  
(2 liquids/multiple/very low flow rate)
- **Fully automated drum cabinet system**  
(transportation/filling)
- **Slurry dilution & delivery system**  
(central/local supply)
- **Chemical dilution & delivery system**  
(central/local supply)





Cost Reduction × Quality Improvement × Longer Facility Life × Automation

# Engineering Group Contributing to Problem Solving

- We create and propose new technologies and high value-added equipment.
- We design and manufacture original equipment based on the concept of "Face and solve problems that arise on site".

## Proposal of equipment customization

We offer design proposals that raise the functionality of equipment to the next level. Contact us for completely original designs.

## Total cost reduction

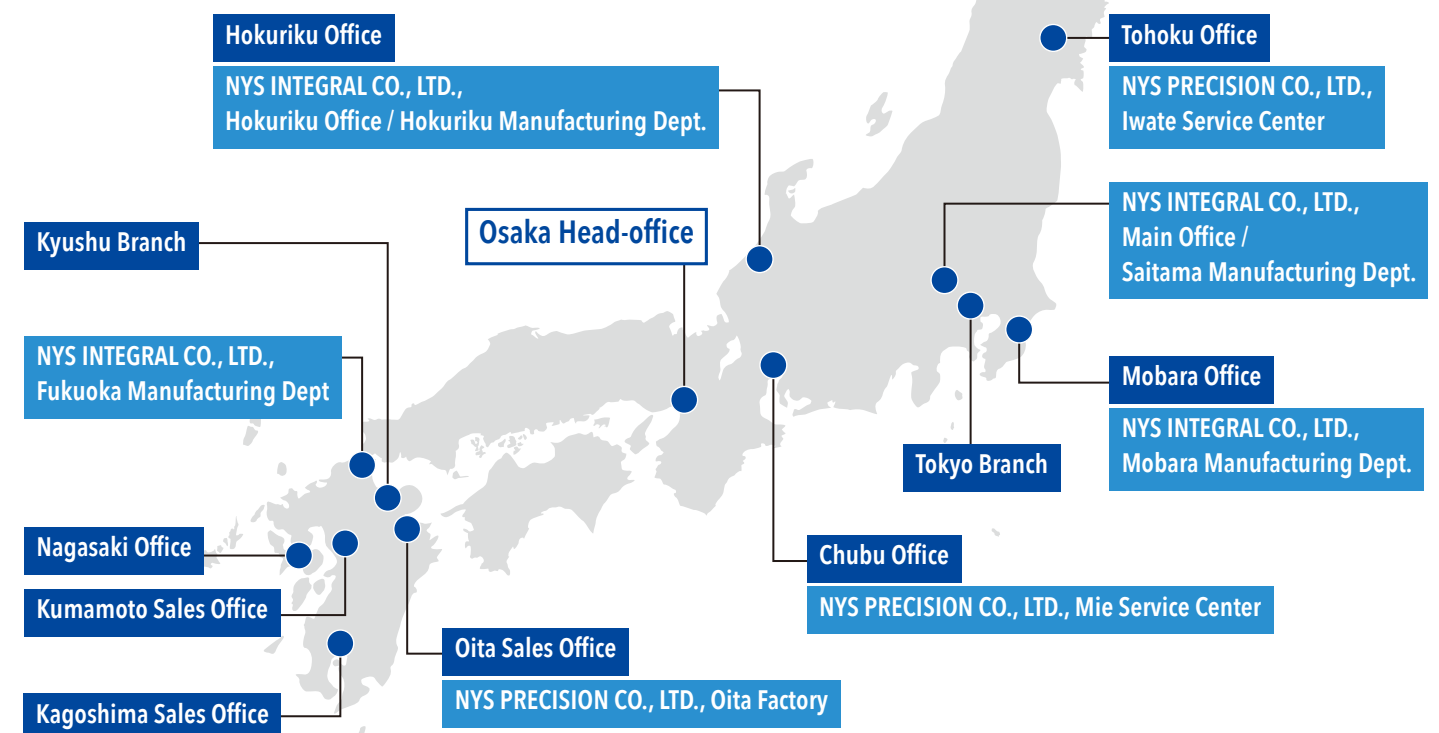
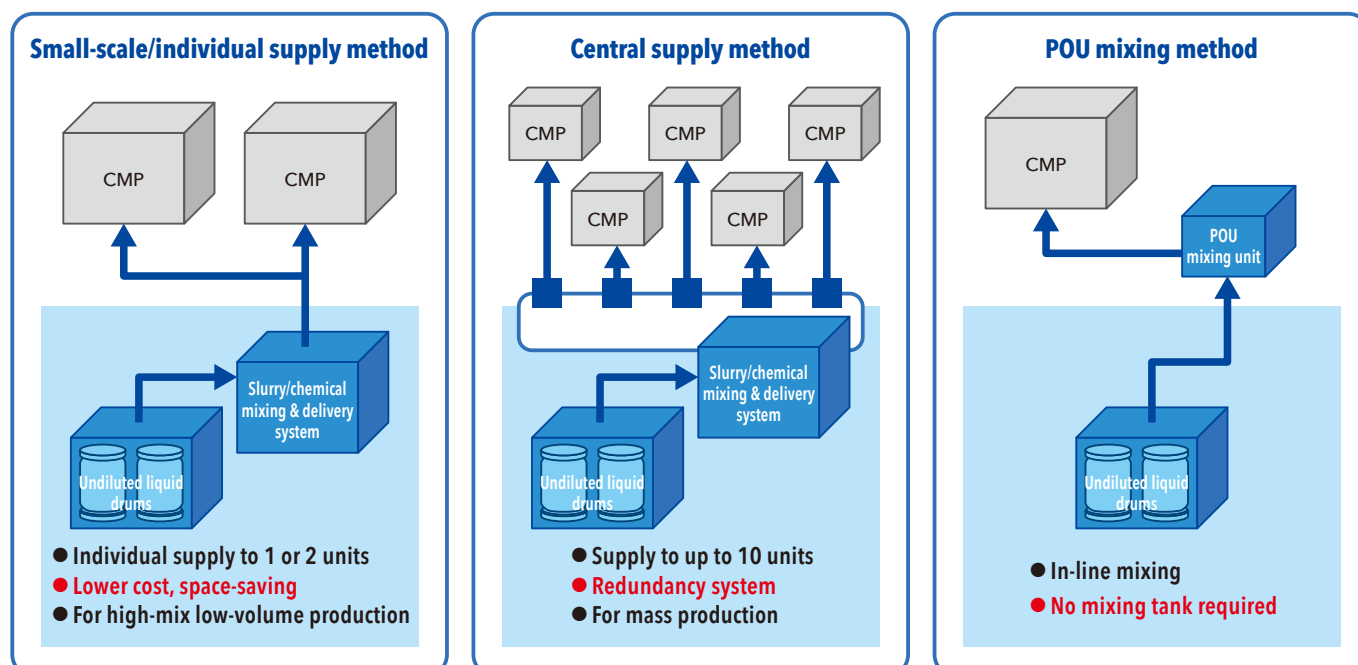
We offer proposals for performance improvement to achieve total cost reductions.

## Low trouble rate

Our design policy is to meet users' needs with safety-first concept. Our multi-stage check mechanism can prevent problems from happening.

## Quick & Fast Response

We aim to respond in about 1/2 the time of other companies.



Polishing liquid delivery system: Patent No. 6538952, Patent No. 6538953, Patent No. 6538954, Patent No. 6698921, Patent No. 6667032, Patent No. 7133518  
Liquid injection & extraction system: Patent No. 7102600, Patent No. 7214029 Measuring device: Patent No. 7039764



# POU Mixing System



Space saving

For high-mix low-volume production

Fresh slurry can be supplied without worrying about pot-life expiration or degradation over time.

NYS's unique system configuration achieves **"high efficiency"**, **"high accuracy"** and **"tankless operation"**.

POU mixing ensures the stable quality of mixed liquids without pot-life expiration or degradation over time.

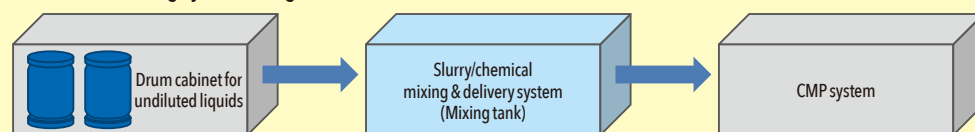
Simple equipment and system configuration saves space and offers high maintainability.

- Liquid materials are mixed, prepared and supplied just before entering a CMP system.
  - Multi-liquid mixtures such as UPW and undiluted slurry + additives ( $H_2O_2$ )
- Concentration can be easily changed even during dispensation processes.
- Unitizing the mixing and dispensing sections results in reduced downtime.
- This system is suitable for various mixing processes and ideal for high-mix low-volume production.

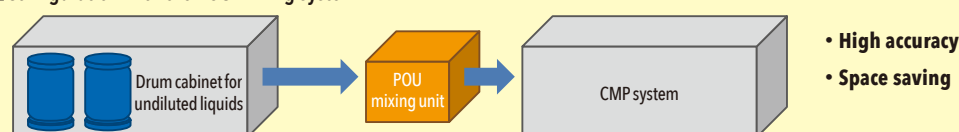
\* This system requires ancillary equipment to stably supply pulseless UPW and undiluted liquids.

## Space saving by introducing the POU mixing system

### Conventional mixing system configuration



### Configuration with the POU mixing system



- High accuracy
- Space saving

Conventional equipment  
(1800×1000×2100mm)

vs.  
POU mixing system  
(600×1200×400mm)  
**More than 90% less space**

\* The size ratio is an example and may vary depending on the system configuration, installation location, etc.

## Multiple supply with the POU mixing system (sample image)

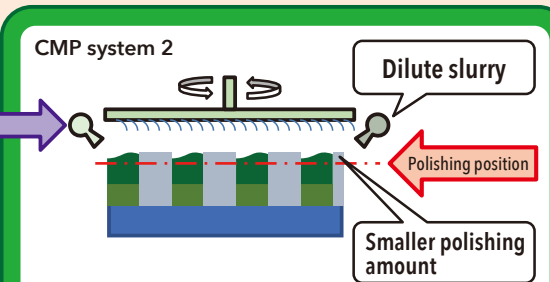
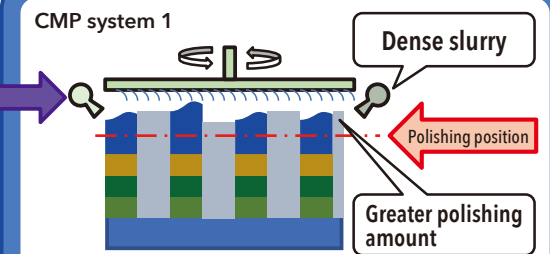
◎When using multiple CMP systems, the concentration of the same undiluted slurry can be set for each system according to instructions from the CMP system.

### POU mixing multiple supply system



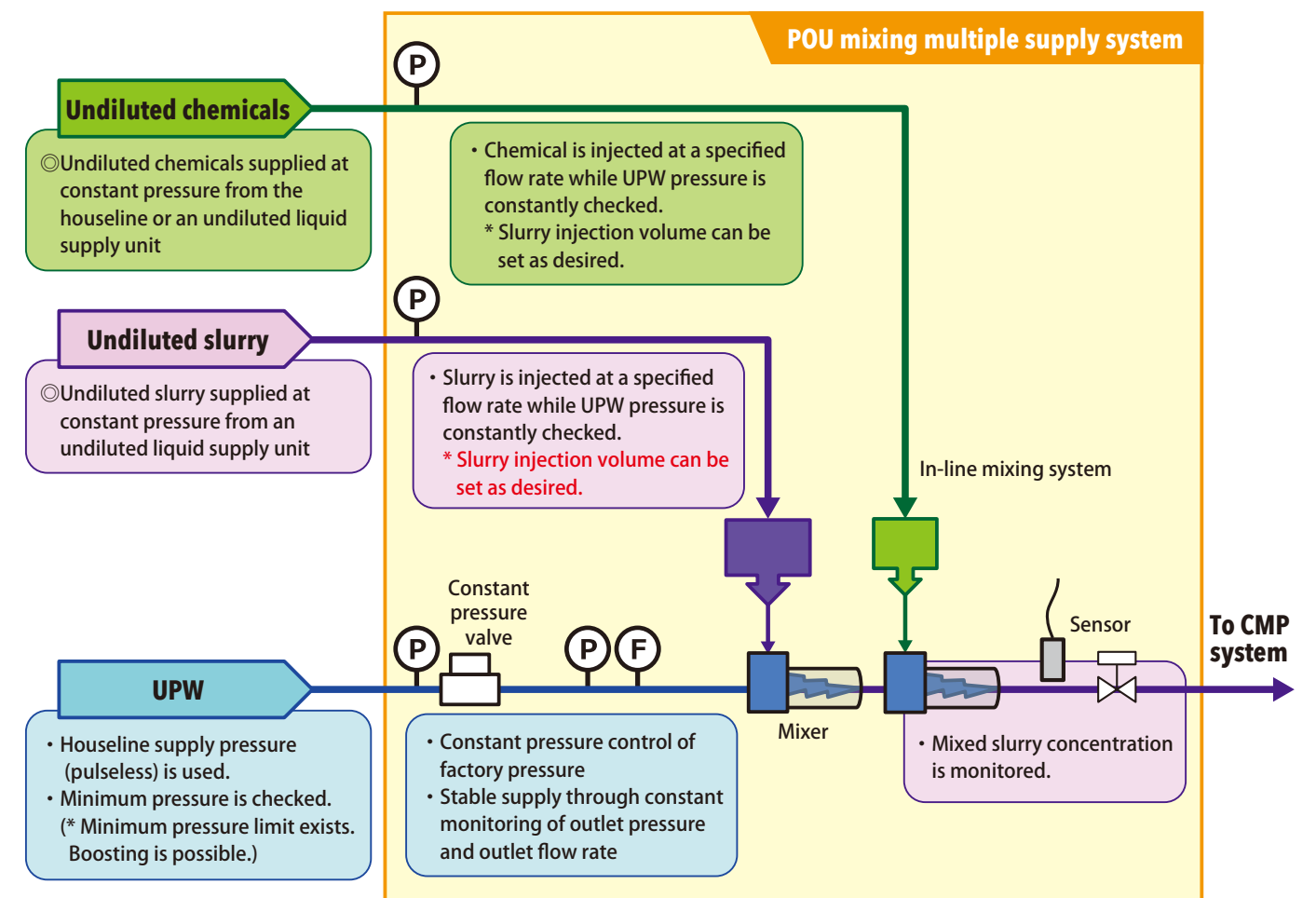
- Variable concentration mixing is available with a single mixing system (slurry concentration can be changed as desired during polishing).

### CMP system



## System configuration example (slurry + chemical + UPW)

The POU mixing multiple supply system is tankless, with its functional sections housed in a 600 x 1200 mm space, aiming to improve space efficiency.





## Fully automated drum cabinet system

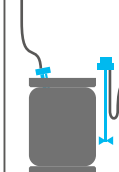
**Problems of conventional methods are solved by achieving full automation of drum replacement and chemical supply.**



## Injuries of workers

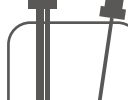


## Setup errors



A diagram of a gas cylinder with a blue arrow pointing to the top of the cylinder, indicating a setup error. The cylinder is shown inside a container, and the arrow points to the top of the cylinder, which is not the correct location for the gas inlet.

## Loss of undiluted liquids



**Stable supply of undiluted liquids with drum replacement's 24-hour availability**  
**Increased equipment uptime by reducing drum replacement costs and time loss**

- Drum insertion using an AGV is supported.
- Various set-ups (opening/closing the lid, inserting a tube and a stirrer, pumping, cleaning, etc.) are automatically performed during drum replacement.
- Its structure minimizes impact from steps and slopes.
- A drum can be set while still on the carriage.

**Flexible customization available to meet users' needs!**

**Drum delivery using an AGV**  
(sample image)

AGV's arrival is confirmed and reported via Wi-Fi communication, etc.

Safety check using an area sensor with an angular resolution of  $0.2^\circ$ , which detects any approaching objects (humans, AGV, etc.)

Protected field 8.4 m

Undiluted liquid drum

AGV

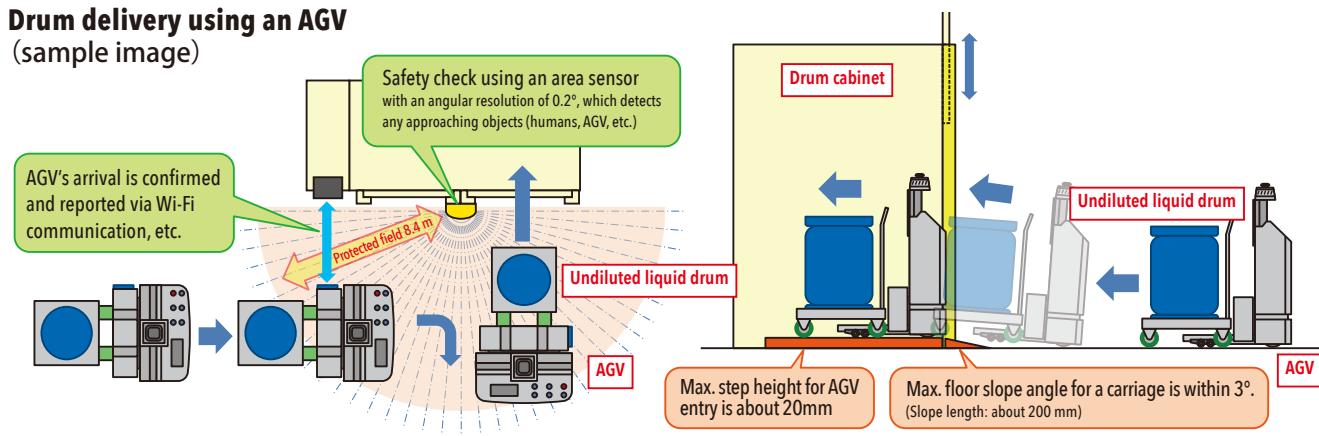
Drum cabinet

Undiluted liquid drum

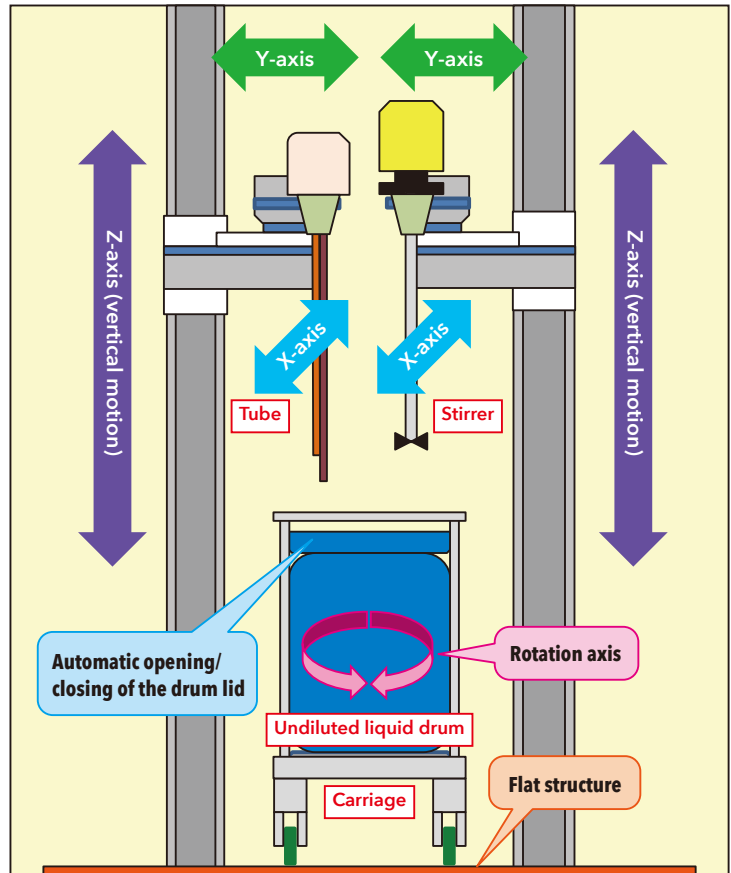
Max. step height for AGV entry is about 20mm

Max. floor slope angle for a carriage is within  $3^\circ$ .  
(Slope length: about 200 mm)

AGV



## System Overview



## Key Features

**Automatic insertion of tube and stirrer:** After the camera recognizes the lid position, the drum position is adjusted, the lid is opened and the tube and the stirrer are inserted.



Hole position recognition,  
Drum position adjustment



### Opening of the drum lid





### Insertion of tube and stirrer



### Completion of insertion

## Automatic opening/closing of the drum lid

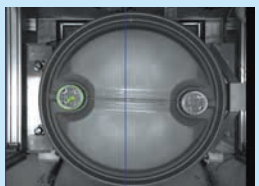
After a carriage is brought in (manually or with AGV), the drum lid position is detected through image recognition and the lid is opened and closed automatically.



Recognized image of drum lid

Automatic opening/closing with robotic arm

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Recognized image of drum lid



Automatic opening/closing  
with robotic arm

## Automatic tilting drum

The weighing scale monitors the remaining amount of undiluted liquid and the drum tilts when the amount becomes low so as to minimize the loss of undiluted liquid.



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## Product Lineup

### ● POU mixing system (2 liquids/multiple/very low flow rate)

High accuracy   Space saving   Concentration changeable while being supplied   For high-mix low-volume production

### ● Slurry dilution & delivery system

Central supply   Local supply   Various mixing processes   Pump supply   N<sub>2</sub> pressure-fed supply

### ● Chemical dilution & delivery system

Central supply   Local supply   Various mixing processes   Pump supply   N<sub>2</sub> pressure-fed supply

### ● Fully automated drum cabinet system

Drum insertion using an AGV   Automatic set-ups   Drum-on-carriage setting

### ● Special chemical dilution/mixing system

Central supply   Local supply   In-line chemical mixing   Pump supply   N<sub>2</sub> pressure-fed supply

### ● Chemical delivery system

Central supply   Local supply   Pump supply   N<sub>2</sub> pressure-fed supply

### ● Pure water booster unit

Pump supply   Local supply

### ● Pure water heating unit

Pump supply   Local supply

### ● Drum cabinet for undiluted liquids

Optimal-use mechanism of undiluted liquid

### Slurry dilution & delivery system



Drum cabinet/Dilution & delivery unit

Valve box

### Centralized chemical delivery system



Centralized chemical delivery unit

Drum cabinet

\* The above-listed configuration, specifications and photos of the systems are examples.

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