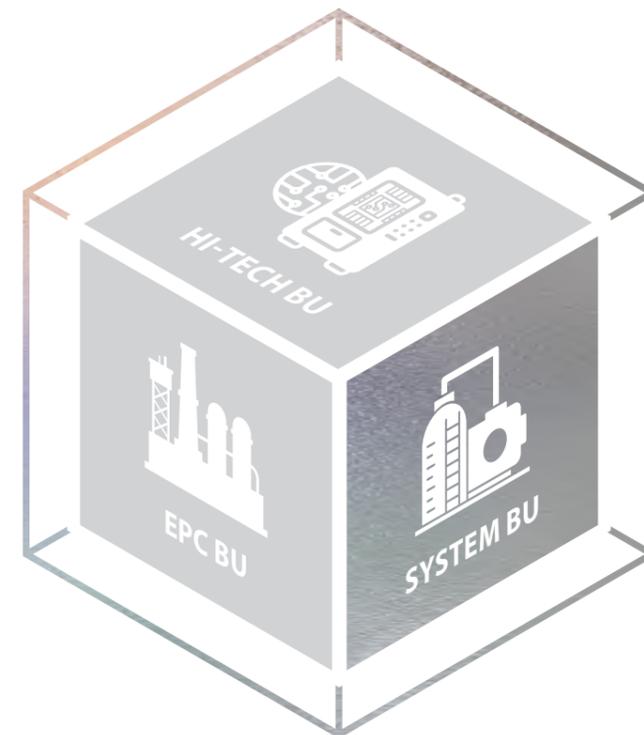


# TOTAL SOLUTION PROVIDER

—

## SYSTEM BU



**HANYANG ENG CO.,LTD**

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## A Global Company that Provides Total Engineering Solutions

HANYANG ENG is leading the creation of customer value by implementing the best quality and services through quality management. HANYANG ENG, which provides the best total service to customers with the best technologies in the semiconductor and display fields, industrial plants (general industry and gas industry), environment, green energy, and aerospace field, is realizing sustainable growth with creative technologies to create a bigger tomorrow through innovation.

## Business Area

- ACQC(Auto Clean Quick Coupler)
- Drum System
- Transfer System
- Supply System
- Mixing System
- Slurry System
- Liquid Waste Collection System
- Automation System
- Customizing System
- CCSS(Central Chemical Supply System)

### SYSTEM BU

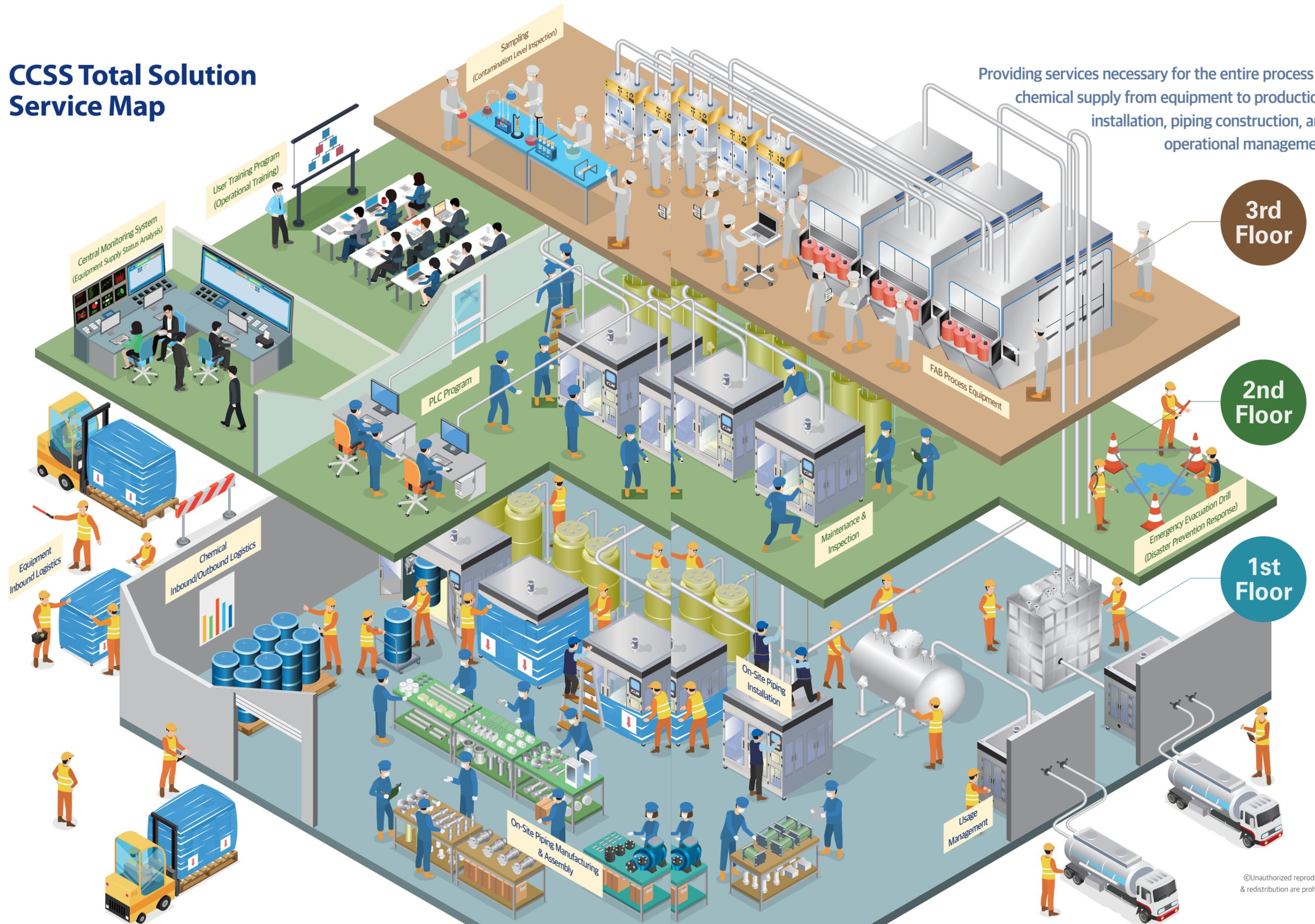
**We Strive for Customer Satisfaction  
with the Best Technology and Quality**

HANYANG ENG's Total Chemical Management System is the proud achievement of the System Business Unit.

The System Business Unit plays the role of a Total Solution Provider that provides the service of the entire process of chemical substance supply from design to manufacturing, installation, operation, and maintenance with our own technology to satisfy customer needs.

# CCSS Total Solution Service Map

Providing services necessary for the entire process of chemical supply from equipment to production, installation, piping construction, and operational management



3rd Floor

2nd Floor

1st Floor

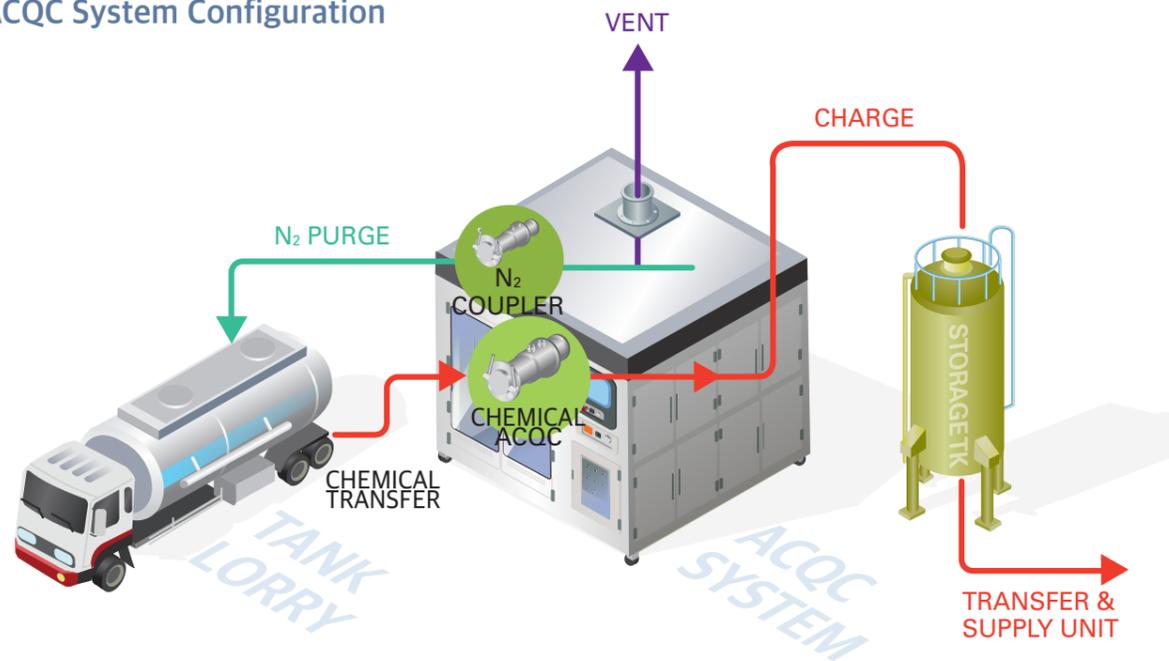
# ACQC System

## Clean & Safe Automated Transfer System

The ACQC (Auto Clean Quick Coupler) System prevents external contamination with automatic cleaning and drying functions added to the coupler connection process for transferring the chemicals contained in the tank truck to the large-capacity storage tank, and ensures safe chemical transfer by helping the pressurization and exhaustion of the tank truck during the chemical transfer process.

User safety is ensured by installing 2 or more chemical modules in 1 equipment to save space and cost, and automating the entire coupler fastening process, depending on the user environment.

### ACQC System Configuration



### Unit Information



Material	PVC		
Size(WxDxH)	1800×2000×2000(mm)		
Weight	800kg		
Electrical Specifications	208V-10-60Hz-2.2kW		
Flow Rate	100 LPM		
Remark	-		
Piping	50A		
Utility Consumption	CDA	Flowrate	490 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	450 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
Exhaust	15.2m <sup>3</sup> /min		

\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.

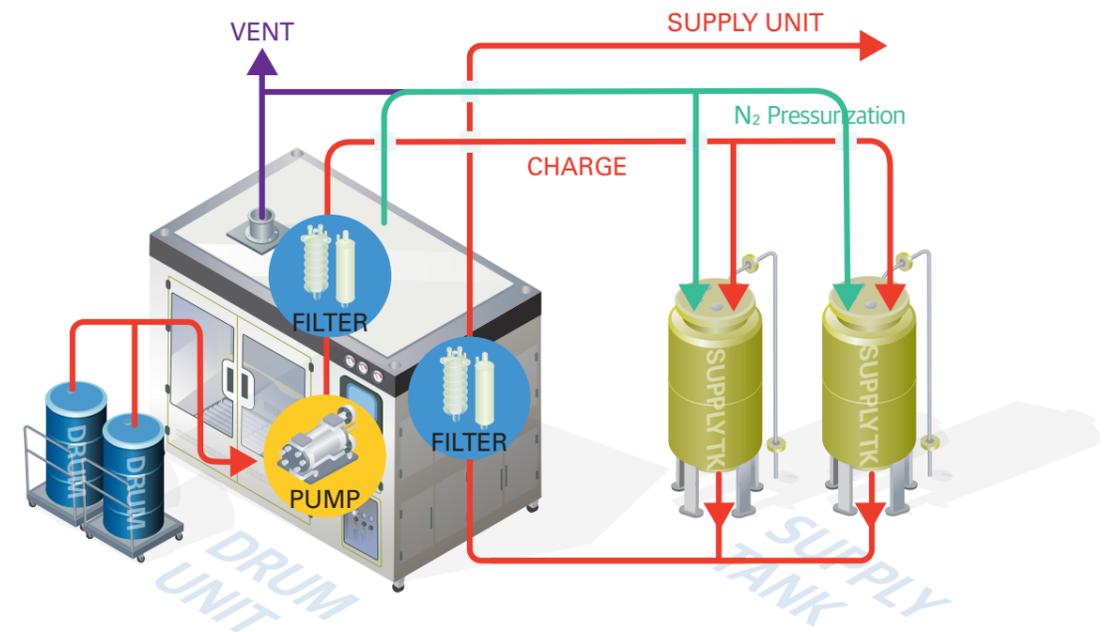
# Drum System

## The Convenient & Reliable Chemical Storage System

The Drum System, the basic equipment of the central supply system, uses a pump for the chemicals from the drum or canister and the high-purity chemicals, impurities removed by an air separator and high-quality filter, are stored in the tank.

The cross-supply method using 2 tanks and nitrogen gas pressurization guarantees stability and continuity in supply, and can be used for direct supply or transfer depending on the distance from the equipment to be supplied and the required flow rate.

### Drum System Configuration



### Unit Information

Material	PVC		
Size(WxDxH)	2400×1700×2000(mm)		
Weight	1800kg		
Electrical Specifications	208V-10-60Hz-3.3kW		
Flow Rate	30 LPM		
Remark	2 Drum		
Piping	25A		
Utility Consumption	CDA	Flowrate	445 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	295 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
Exhaust	17.2m <sup>3</sup> /min		

\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.

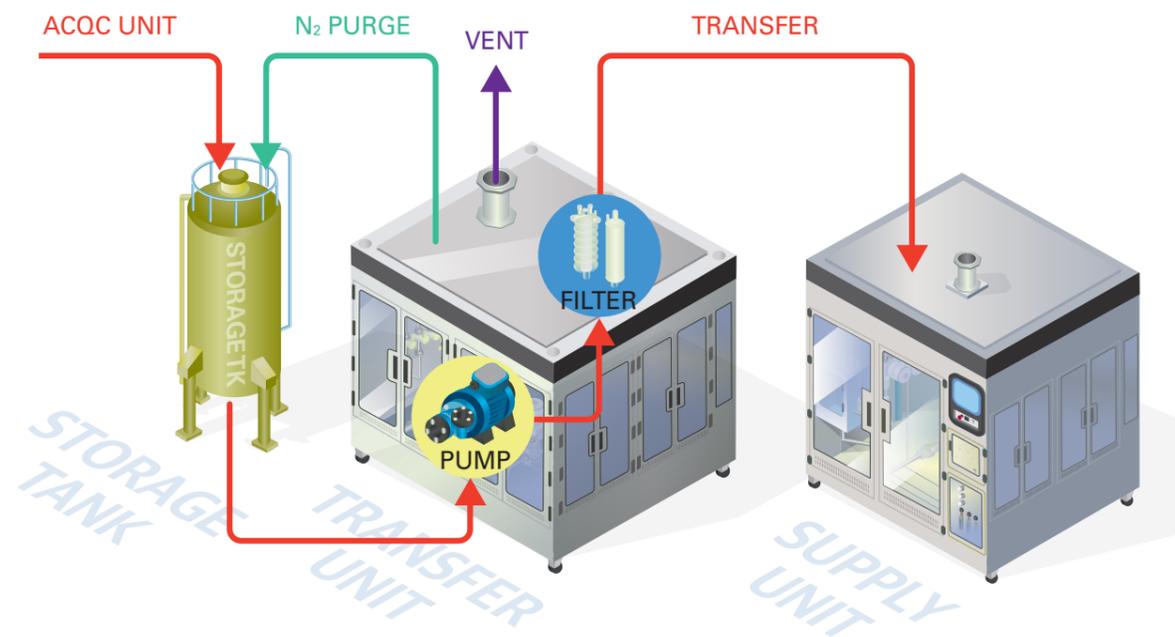


# Transfer System

## The Optimal Solution for Long-Distance Transfer

The Transfer System is a solution for transferring chemicals from large-capacity storage to equipment to be supplied in a long-distance using a high-performance pump or for distributing flow rate to supply equipment. Stability can be secured by installing it at the optimal location, considering the design conditions such as flow rate, pressure loss, head, etc., when chemicals of a lot of flow rate are required.

### Transfer System Configuration



### Unit Information



Material	PVC		
Size(WxDxH)	2000x2000x2000(mm)		
Weight	1500kg		
Electrical Specifications	208V-1Φ-60Hz-2.2kW 208V-3Φ-60Hz-7.4kW		
Flow Rate	150 LPM		
Remark	2 Pump		
Piping	40A		
Utility Consumption	CDA	Flowrate	200 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	285 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
Exhaust		16.8m <sup>3</sup> /min	

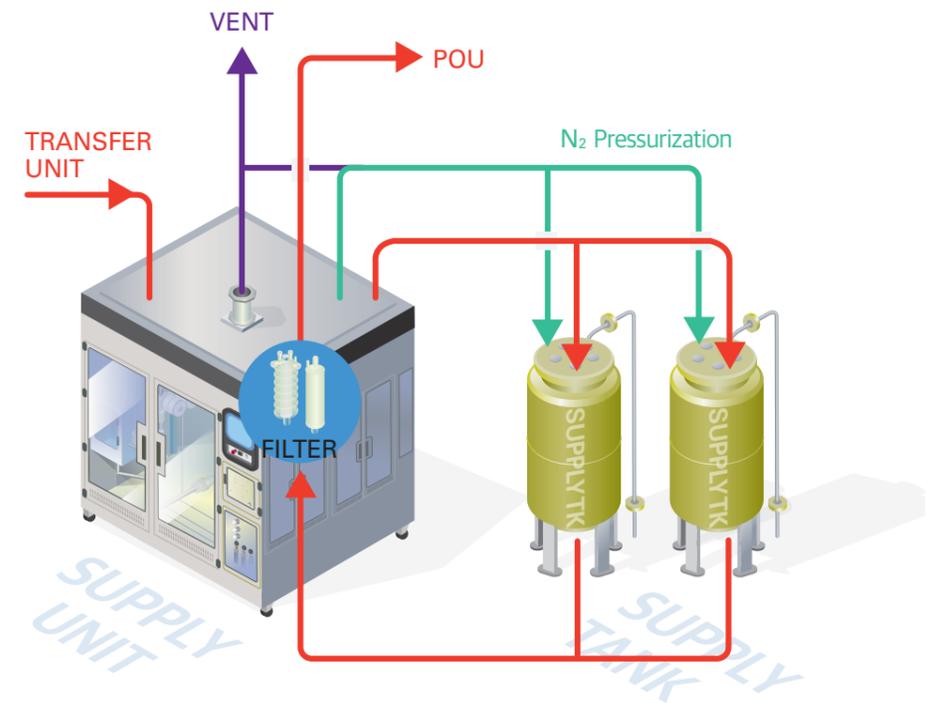
\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.

# Supply System

## The Final Chemical Supply Point

The Supply System, which is responsible for the final supply of chemicals, stores the chemicals from which impurities have been removed in a tank and supplies them through a high-quality filter once more through nitrogen gas pressurization. It is designed to meet the needs of the semiconductor or display process based on the principle of uninterrupted supply and can improve equipment stability by duplexing key parts related to supply.

### Supply System Configuration



### Unit Information

Material	PVC		
Size(WxDxH)	1900x1800x2000(mm)		
Weight	1200kg		
Electrical Specifications	208V-1Φ-60Hz-2.2kW		
Flow Rate	150 LPM		
Remark	-		
Piping	40A		
Utility Consumption	CDA	Flowrate	200 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	285 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
Exhaust		14.4m <sup>3</sup> /min	

\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.

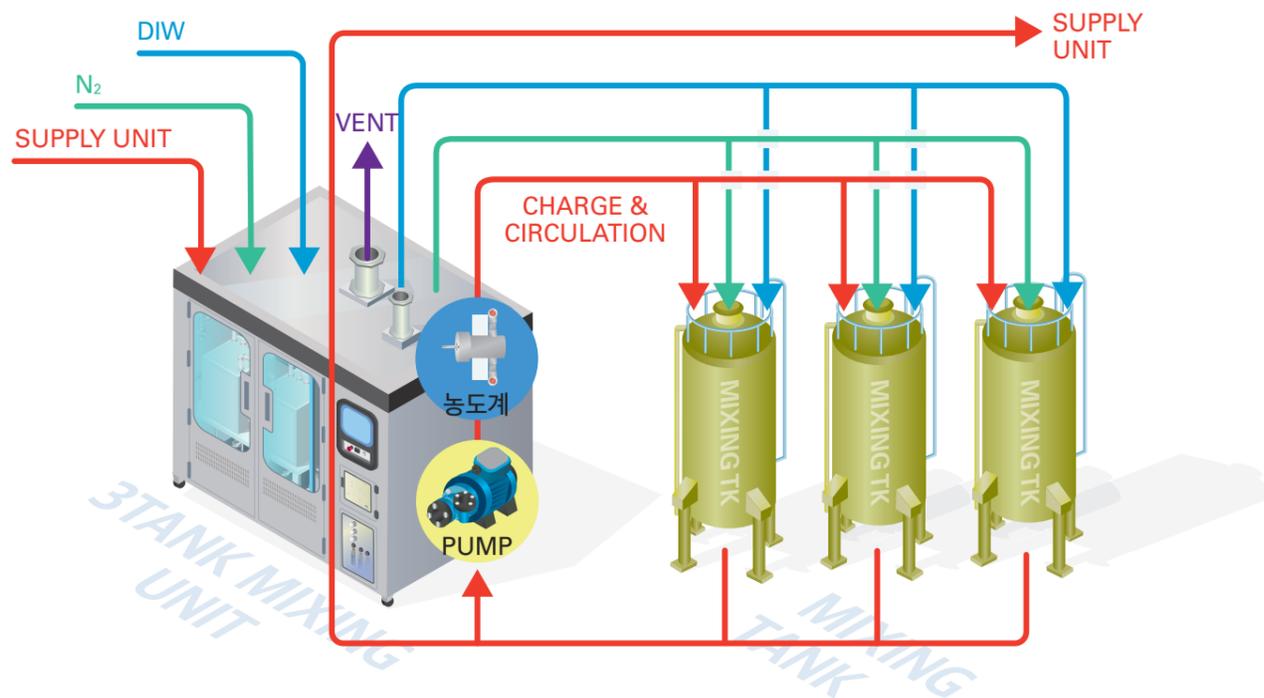


# Mixing System

## The Precise and Productive Chemical Mixing Solution

The Mixing System dilutes high-concentration chemicals to the optimal concentration required for semiconductor and display manufacturing processes and it dilutes the chemicals of undiluted state using DI. The optimized dilution process and sequential mixing method using tanks guarantee high dilution production and the piping configuration designed with HANYANG ENG's know-how keeps the dilution concentration stable.

### Mixing System Configuration



### Unit Information



Material	PVC		
Size(WxDxH)	3400x1700x2000(mm)		
Weight	2300kg		
Electrical Specifications	208V-1Ø-60Hz-3.3kW		
Flow Rate	56000 L/Day		
Remark	1m <sup>3</sup> Tank x 3		
Piping	25A		
Utility Consumption	CDA	Flowrate	200 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	500 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
	Exhaust	24.3m <sup>3</sup> /min	

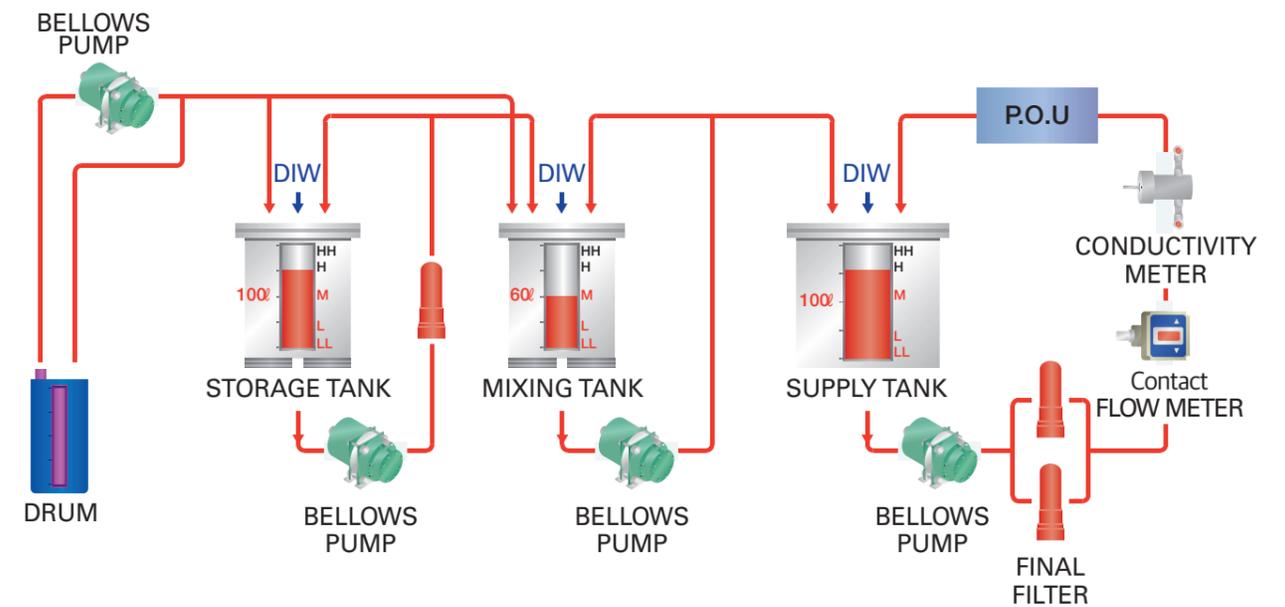
\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.

# Slurry System

## Optimized Solution for Slurry Supply

The slurry is a suspension containing fine solid particles and it is an abrasive that physically and chemically polishes wafers or insulating film layers in the semiconductor manufacturing process to make them flat. It is a medium that transfers the abrasive particles and chemicals of the water, which is the work piece.

### Slurry System Configuration (One Drum Option)



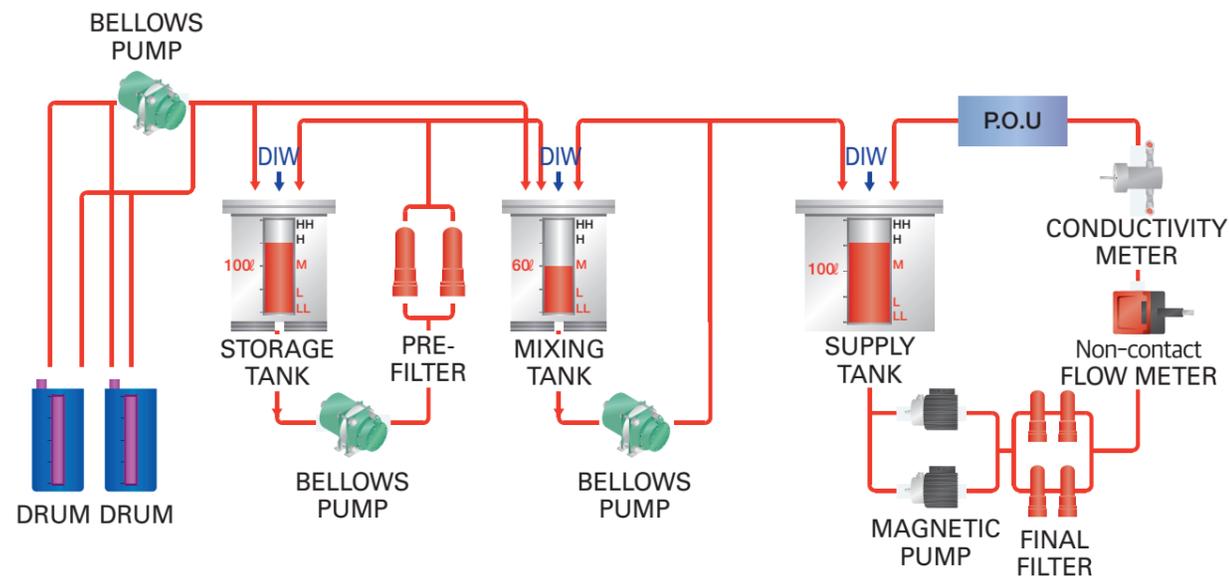
### Unit Information

Size(WxDxH)	2600x2000x2200(mm)	
Weight	3000kg	
Electrical Specifications	208V-1Ø-12kW	
Flow Rate	8 LPM	
Equipment Type	Single Type	
Operation Method	Bellows Pump	
Charge Option	1 Drum	
Mixing Option	1/2" 1ea	
Filter Option	Type	Manual Filter
	Quantity	Pre 1ea, Final 2ea
Parts Option	Flow Meter	Contact Flow Meter
	Measuring Tool	Conductivity Meter
Additional Option	-	



# Slurry System

## Slurry System Configuration (Two Drum Option)

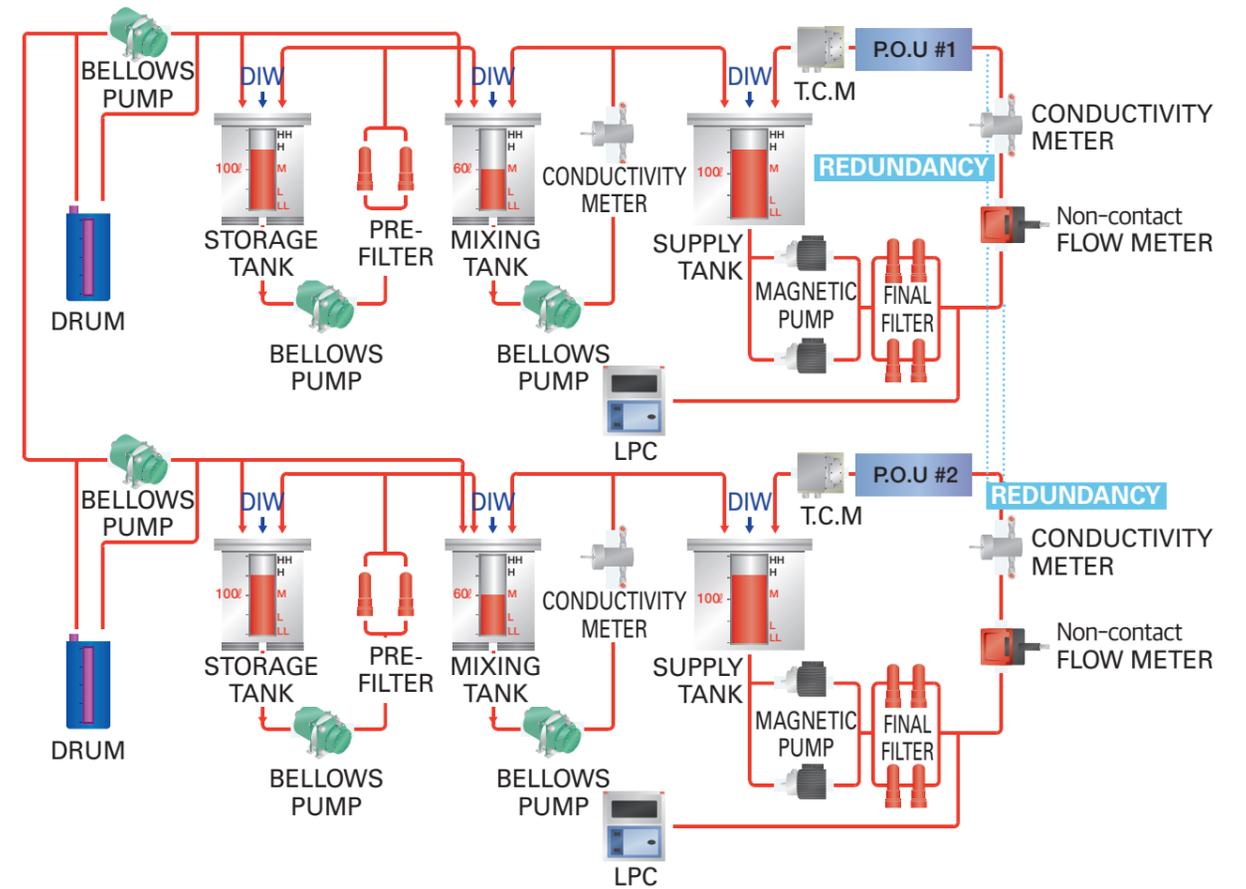


## Unit Information



Size(WxDxH)	3300x2000x2200(mm)	
Weight	3300kg	
Electrical Specifications	208V-1Φ-12kW	
Flow Rate	8 LPM	
Equipment Type	Single	
Operation Method	Bellows, Magnetic Pump	
Charge Option	2 Drum	
Mixing Option	1/4", 3/4" 2ea	
Filter Option	Type	Auto Filter
	Quantity	Pre 2ea, Final 4ea
Parts Option	Flow Meter	Non-contact Flow Meter
	Measuring Tool	Conductivity Meter
Additional Option	Filter Touch Screen	

## Slurry System Configuration (Two in One, "First" Option)



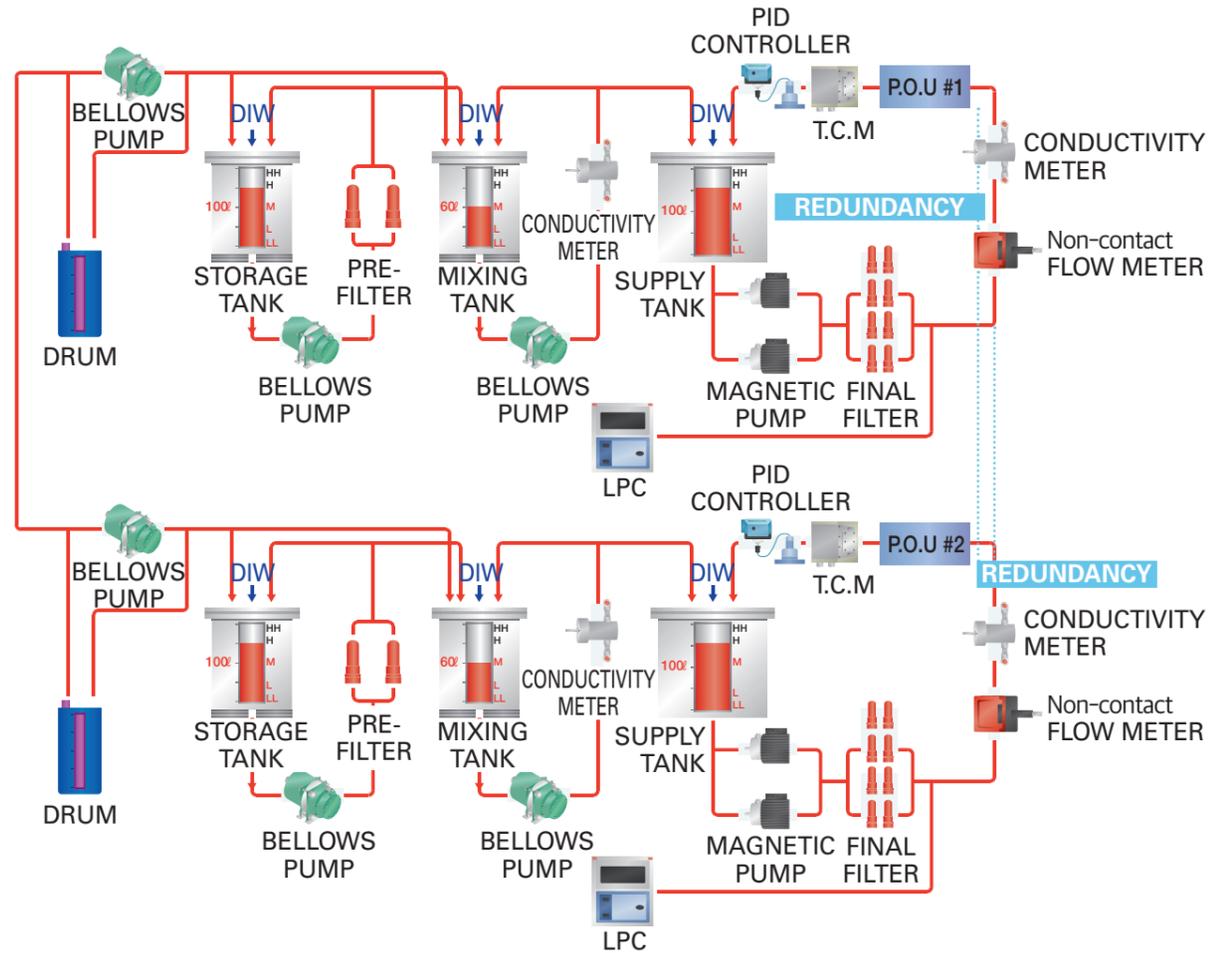
## Unit Information

Size(WxDxH)	6000x2000x2200(mm)	
Weight	7000kg	
Electrical Specifications	208V-1Φ-12kW	
Flow Rate	8 LPM	
Equipment Type	Single + Single (Redundancy Box로 연결)	
Operation Method	Bellows, Magnetic Pump	
Charge Option	1 Drum	
Mixing Option	1/2", 3/4" 2ea	
Filter Option	Type	Auto Filter
	Quantity	Pre 2ea, Final 4ea
Parts Option	Flow Meter	Non-contact Flow Meter
	Measuring Tool	Conductivity Meter
Additional Option	Filter Touch Screen TCM, LPC	



# Slurry System

## Slurry System Configuration (Two in One, "Second" Option)



### Unit Information



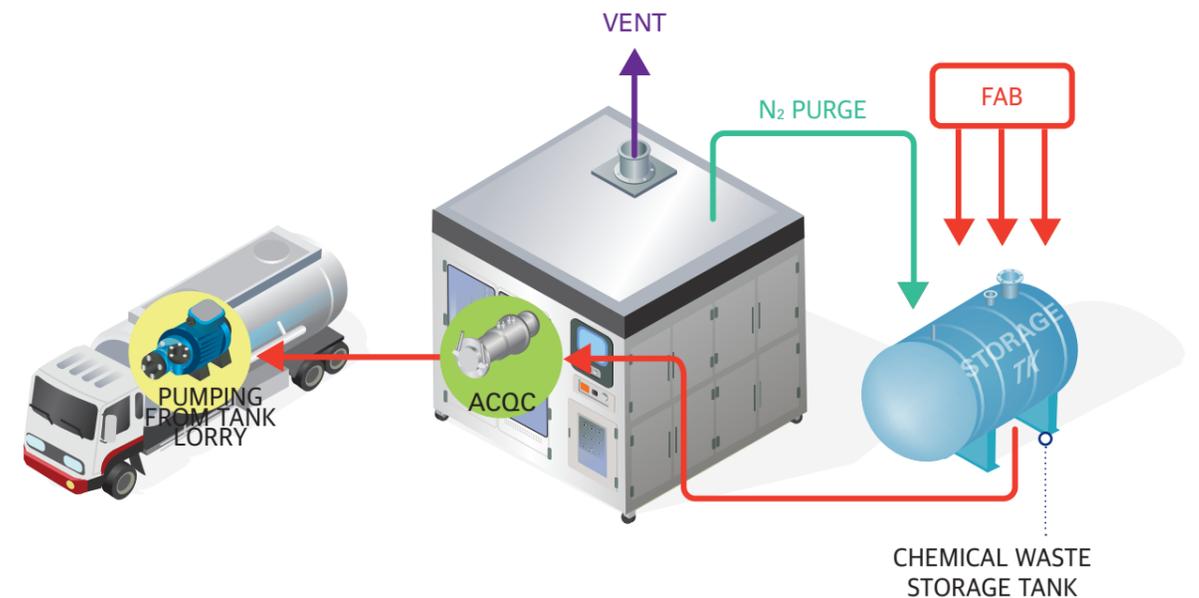
Size(WxDxH)	3300×4900×2200(mm)	
Weight	7500kg	
Electrical Specifications	208V-1Φ-12kW	
Flow Rate	8 LPM	
Equipment Type	Single + Single (Redundancy Box로 연결)	
Operation Method	Bellows, Magnetic Pump	
Charge Option	1 Drum	
Mixing Option	1/4", 3/4" 2ea	
Filter Option	Type	Auto Filter
	Quantity	Pre 2ea, Final 8ea
Parts Option	Flow Meter	Non-contact Flow Meter
	Measuring Tool	Conductivity Meter
Additional Option		Filter Touch Screen TCM, LPC

# Chemical Waste Collection System

## The Safe & Reliable Chemical Waste Disposal Solution

This system stores and monitors wasted chemicals in large tanks which were discharged in the process of producing semiconductors and displays. It informs operators of when accumulated wasted chemicals exceed certain amount. In addition, this system can safely build couplers to the tank lorry car to safely dispose of wasted chemicals. It predicts the potential problems which can occur depending on the type of wasted chemicals, and prevents the problems by installing a diluting system or keeping the tank and piping warm.

## Chemical Waste Collection System Configuration



### Unit Information

Material	PVC		
Size(WxDxH)	2400×1800×2000(mm)		
Weight	2500kg		
Electrical Specifications	208V-1Φ-60Hz-2.2kW 208V-3Φ-60Hz-5.5kW		
Flow Rate	-		
Remark	-		
Piping	40A		
Utility Consumption	CDA	Flowrate	445 LPM
		Pressure	7.5kgf/cm <sup>2</sup>
	N <sub>2</sub>	Flowrate	295 LPM
		Pressure	6.5kgf/cm <sup>2</sup>
Exhaust		17.2m <sup>3</sup> /min	

\*Since the above flow rate is data based on water, it may vary depending on the fluid properties used and site conditions.



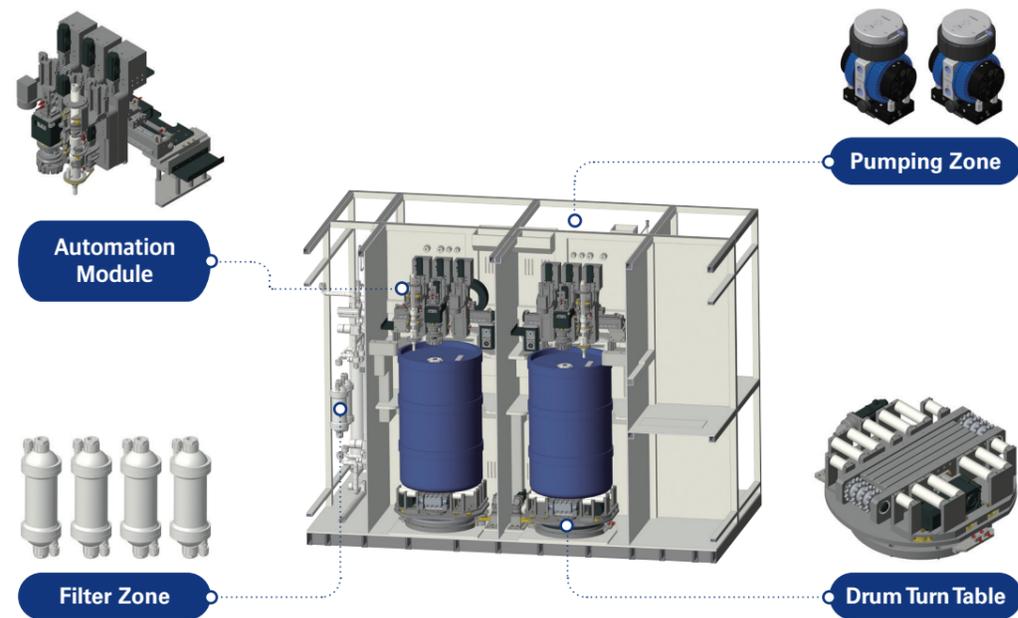
# DACS

(Drum Auto Coupler System)

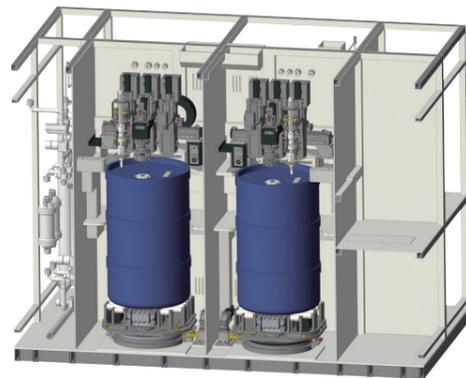
## Drum Automation System that Safely Transfers High-purity Chemicals

DACS (Drum Auto Coupler System) is a drum automation supply system that safely transfers high-purity chemicals supplied to the drum to the storage tank and it can prevent safety accidents and exposure of chemicals that may occur during drum replacement by accompanying the loading and fastening processes. The information of the drum brought to the equipment is measured through the vision camera, the precise fastening and supply process are implemented through the servo motor, and maintenance is facilitated by applying the one-touch separation method for each module.

### DACS Configuration



### Unit Information



Size(WxDxH)		-
Weight		-
Moving Method		Servo(AC200V, 100W~400V), + Ball Screw
Utility	Power	UPS-AC208V-1Φ-60Hz-12.5kW
	CDA	6 ± 0.5kg/cm <sup>2</sup>
	N <sub>2</sub>	5 ± 0.5kg/cm <sup>2</sup>
	PCW	60L/min

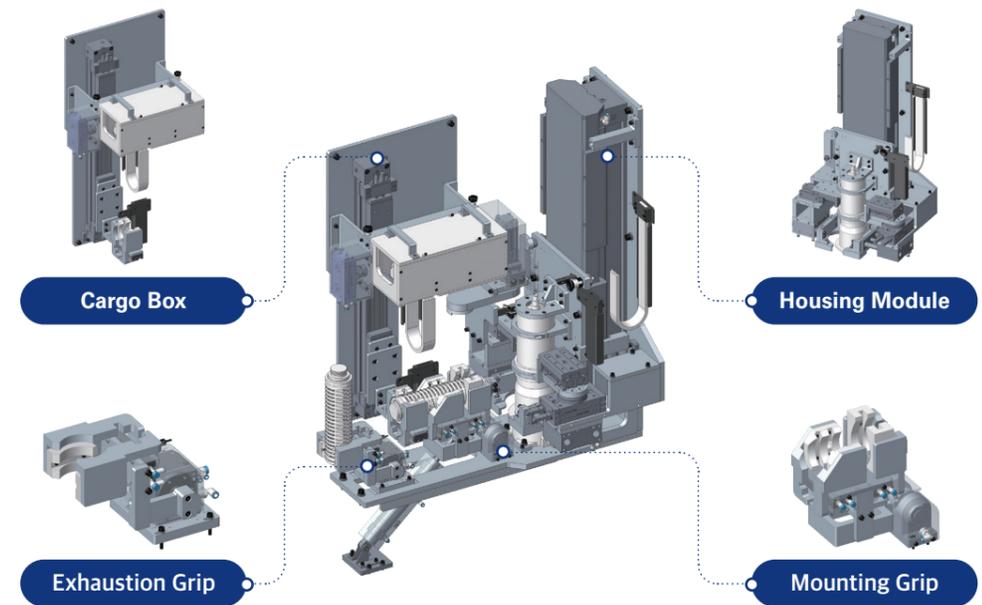
# SFAC

(Slurry Filter Auto Change)

## Automatic Slurry Filter Replacement

SFAC (Slurry Filter Auto Change) is a filter replacement automation system that replaces the filter cartridge required for the slurry supply system by separating and fastening it and it is a system that can prevent safety accidents and exposure of chemicals that may occur during filter replacement. The maintenance is easy as the modular structure simplifies the structure and the cost for filter replacement and the difficulty of manpower supply can be eliminated at the same time.

### Slurry Filter Replacement Automation System Configuration



### Unit Information

Size(WxDxH)		2200×1000×2200(mm)
Weight		600kg
Moving Method		Cylinder + LM Guide
Utility	Power	AC208V-1Φ-60Hz-40A
	CDA	6 ± 0.5kg/cm <sup>2</sup>
	N <sub>2</sub>	-
	PCW	60L/min



# Customizing System

## Implementation of the Optimal System to Meet Customer Needs

HANYANG ENG can implement customized equipment according to customer needs and differentiated systems according to various environments.

### Plastic Unit

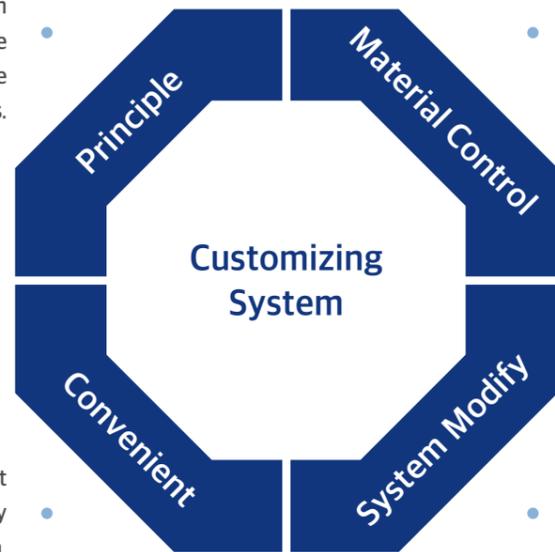


Equipment may vary depending on various conditions but safety is the one principle that does not vary or change under any circumstances.

### Metallic Unit



The system is composed of materials suitable for each chemical property, such as acid, alkali, solvent, etc.



We pursue convenient equipment operation and maximize efficiency through automation.



### Automation

From simple supply equipment to complex multifunctional equipment, we can freely implement the optimal solution that meets customer needs, environments, and purposes.



### Two in One System

## Service development 7 Stage



# CCSS

(Central Chemical Supply System)

## Providing Total Solution Service from Chemical Supply to Maintenance

HANYANG ENG has specialized manpower to manage and operate Central Chemical Supply System that supplies chemicals necessary for semiconductor manufacturing and production processes. In order to sincerely perform the role of a partner of domestic and overseas semiconductor manufacturers, we are always doing our best to provide services that meet the needs of our customers from the point of the set-up of CCSS & slurry equipment to the point of the turn-on by inspecting the work progress with the construction company.

### Supply & Quality Management



## Chemical Drum Charge

Chemicals are safely moved from the stock area to the Central Chemical Supply System using logistics transfer machines (lifts and hoists) and devices (drum pickers and carts) with FIFO as the basic principle and are processed according to SOP.

## CCSS POU Chemical Supply & Maintenance

Through preventive inspection of supply equipment, we manage changes of equipment and detect/predict possible abnormalities in advance to solve problems that can lead to serious accidents at an early stage. We also perform modification work such as equipment and piping construction according to customer requests along with the operational business.

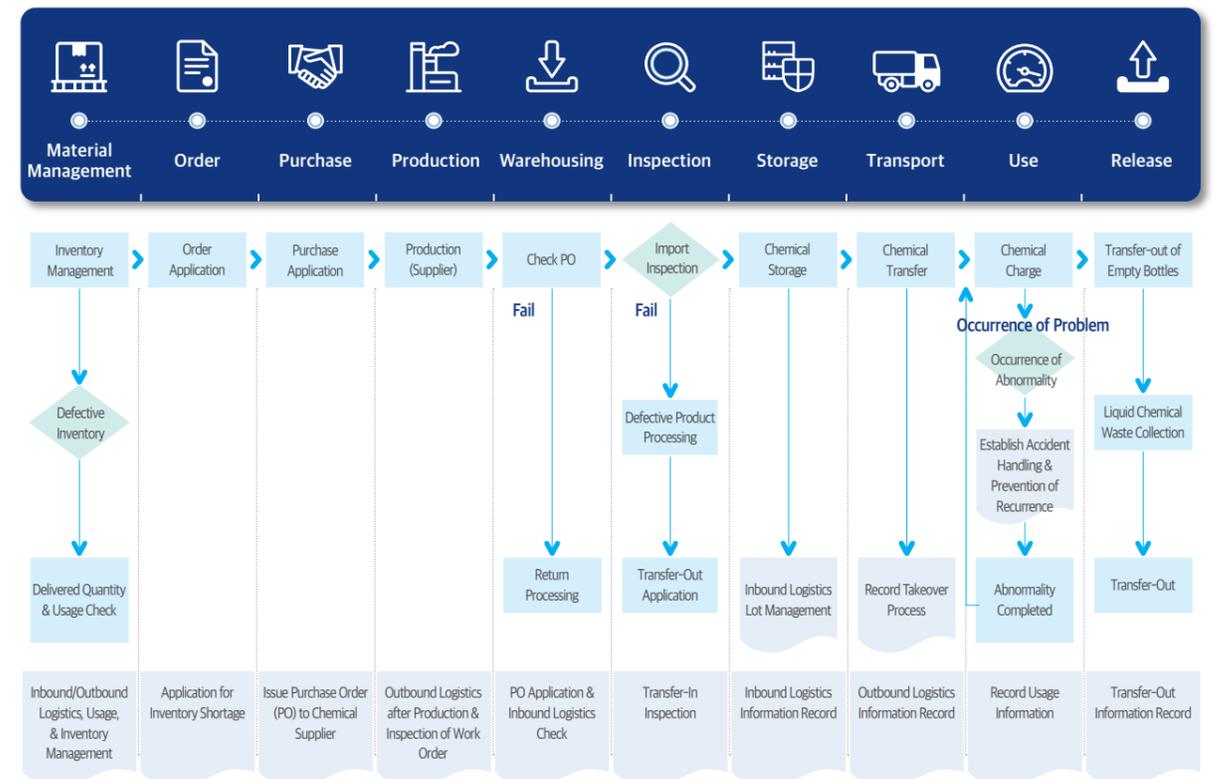
## CCSS Training & Emergency Training

We are doing our best to operate uninterrupted equipment 24 hours a day, 365 days a year through safety training for those who handle chemicals and providing beginner/intermediate/advanced training required for understanding and operating CCSS supply equipment.

## CCSS Risk Factor Removal & Improvement

Through CCSS 5S and illogicality removal/improvement activities, we are simultaneously discovering and improving potential risk factors, contributing to the prevention of accidents.

## Replacement & Transfer-out of Undiluted Solution of Chemicals



## HANYANG ENG

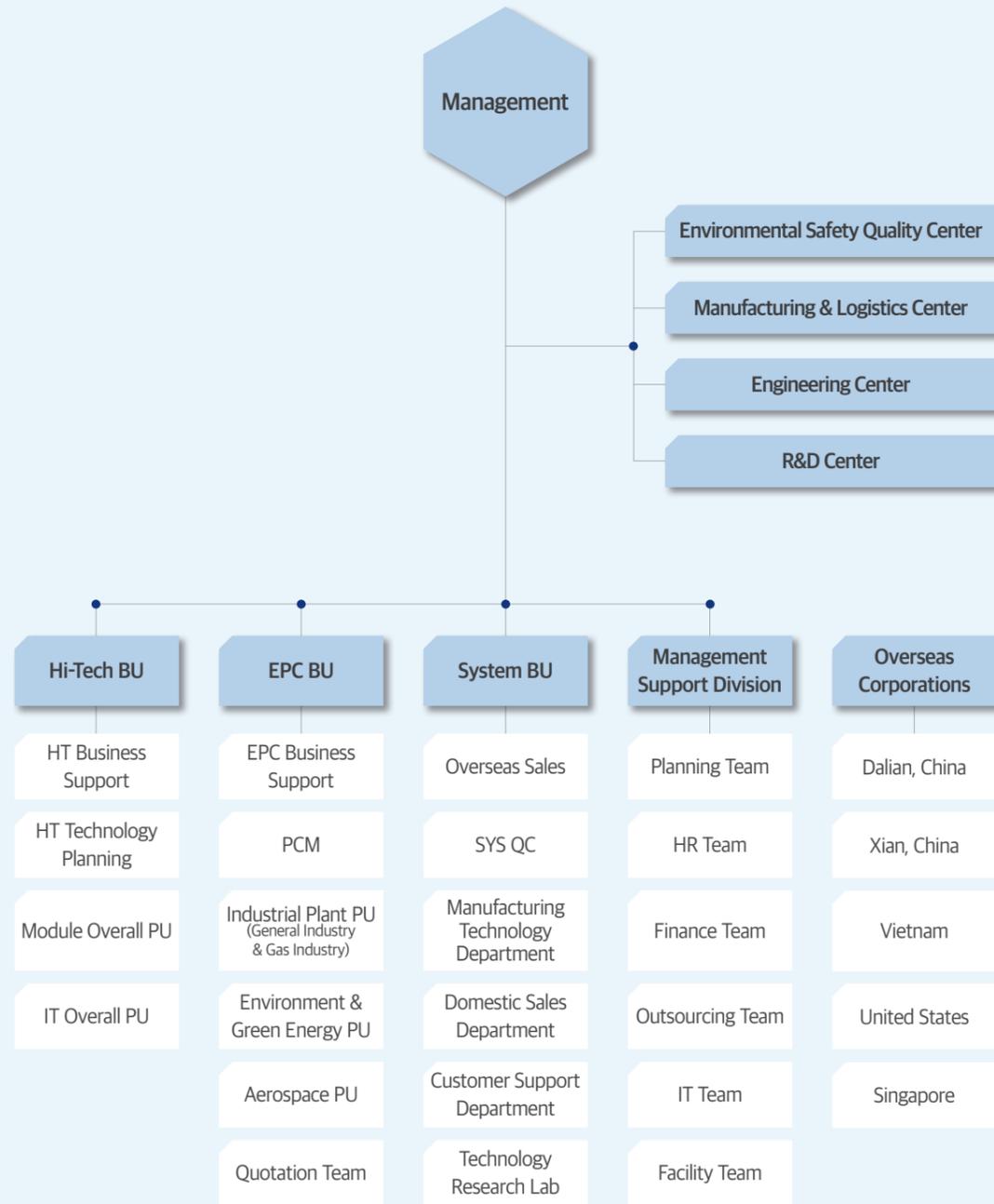
### Total Solution Provider

HANYANG ENG has been recognized for its capabilities by accumulating various business experiences and technologies in domestic and overseas markets since its establishment in 1988.

Now, HANYANG ENG is pursuing substantial growth by discovering new business models and new markets in line with the changing global paradigm to enhance future value, and practicing transparent management. Through this, we will be a 'Total Solution Provider' that provides optimized quality and services in not only the semiconductor/display industry but also in the fields of industrial plants, gas, environment, green energy, and aerospace.

 **HANYANG ENG**

# Organization



\* BU(Business Unit)  
\* PU(Performance Unit)

# Core Value



# Certifications



Equipment Safety Certifications

# Global Network & Subsidiaries

## Domestic & Overseas Business Sites

### Domestic

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#### Manufacturing & Logistics Center (Cheongju)

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#### CTP Korea Co., Ltd.

332-7, Samsung 1-ro, Hwaseong-si, Gyeonggi-do  
Tel. 82-31-202-3734  
<http://www.ctpkorea.com>

※ CV & PV Business Unit separately operated

#### DINNO Co., Ltd.

D-810, 357, Guseong-ro, Giheung-gu, Yongin-si, Gyeonggi-do  
Tel. 82-31-229-3040  
<http://www.d-inno.co.kr>

### Partners

#### HANYANG Digatech Co., Ltd.

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Tel. 82-31-695-5000  
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