GST Abatement Proposal

2023.03.16
GST

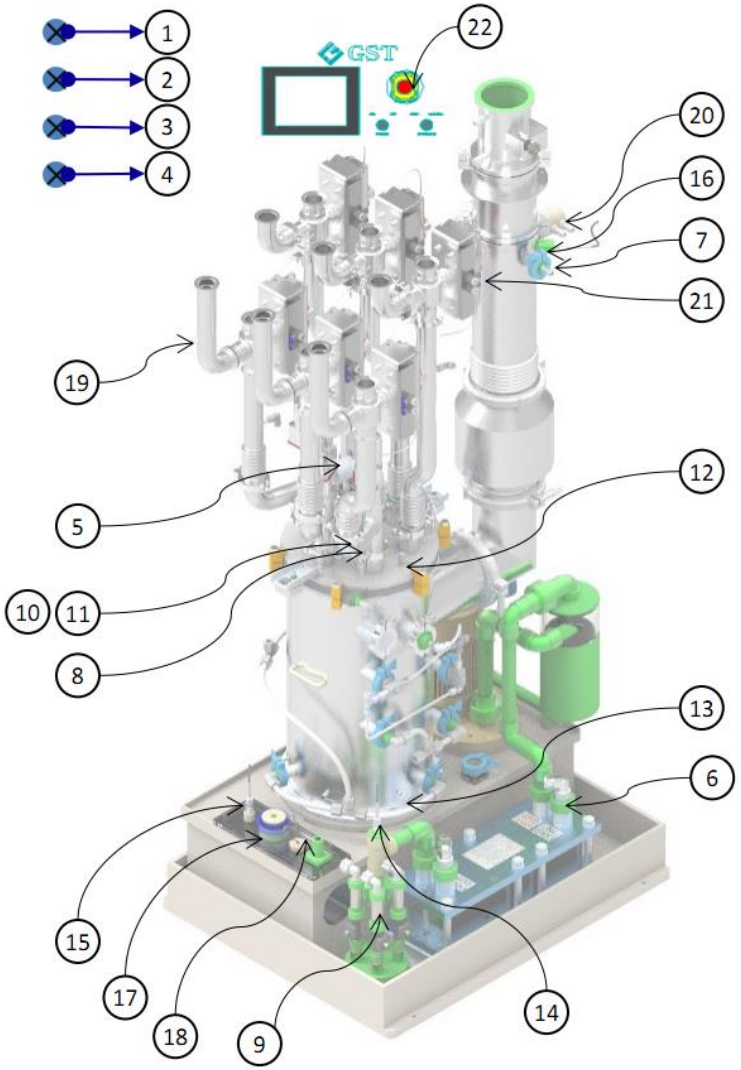
1. Abatements table

Type	Model	Dimension	Inlet Qty	Weight(kg)
Burn-Wet	GAIA(Single)	820(W)x1,000(D)x2,009(H) mm	Max 6(NW40) Max 4(NW50)	750
	GAIA(Dual)	1,575(W)x1,241(D)x1,961(H) mm	Max 6(NW40) Max 4(NW50)	1300
Plasma	GAIA-P single	1000(W) x 1000(D) x 1950(H) mm	Max 6(NW40) Max 4(NW50)	700
	GAIA-P Dual	1824(W) x 1100(D) x 1810(H) mm	Max 6(NW40) Max 4(NW50)	1100
Wet	SWS-I	750(W) x 900(D) x 1800(H) mm	Max 4(NW40)	550
Dry	SDS-500	650(W) * 540(D) * 1650(H)mm	Max 1(NW40)	250

2-1. Burn-Wet

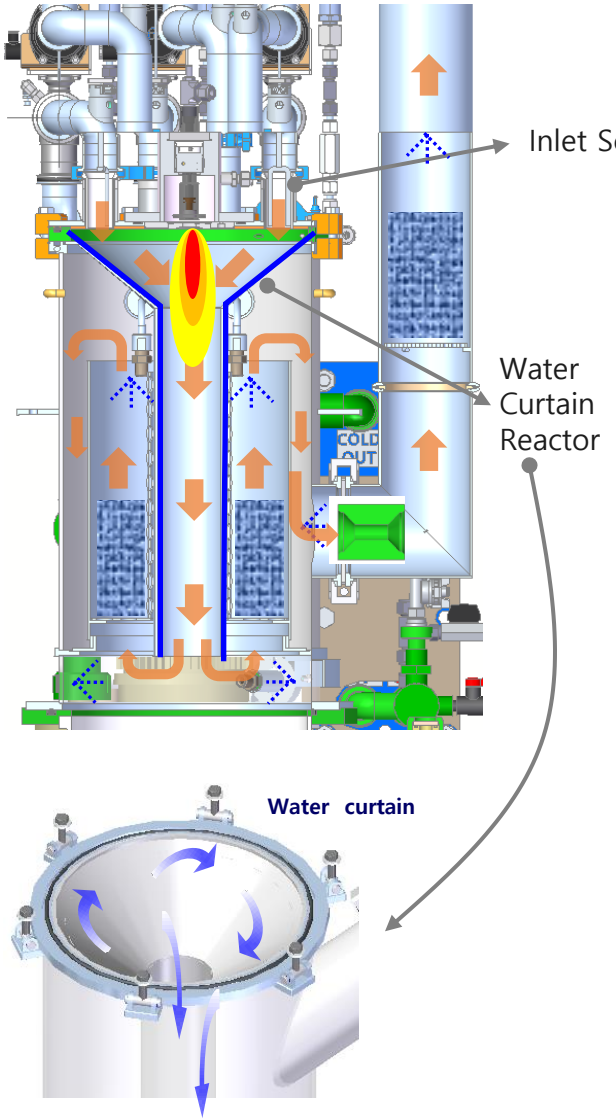
GAIA-I Single	GAIA-I Dual
	
• **System Feature** • 820(W)x1,000(D)x2,009(H) • 750kg • All Process	• **System Feature** • 1,575(W)x1,241(D)x1,961(H) • 1300kg • All Process • Dual PLC, Dual UT Operation

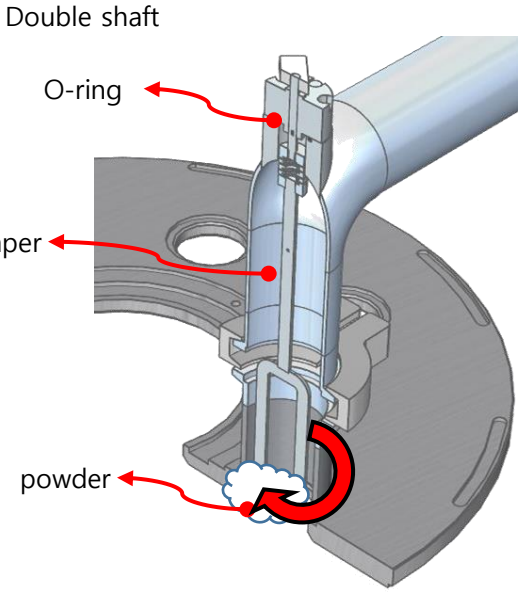
2-2. Burn-Wet(Interlock Design)



NO.	NAME	FUNCTION
1	Pressure' switch	Cabinet Exhaust Pressure
2	Gas detector	CH4 Leakage
3	UV-IR	Fire Detection
4	Leak sensor	Cabinet Water Leak
5	Flame sensor	Burner Flame
6	Flow sensor	PCW Flow
7	Flow sensor	CW Flow
8	Flow sensor	Burner PCW Flow
9	Flow sensor	Circulation Water Flow
10	MFC	CH4 Flow
11	MFC	O2 Flow
12	Temp' switch	Burner Temperature
13	Temp' switch	Reactor Temperature
14	Temp' sensor	Circulation Water Temp'
15	Temp' sensor	Tank water Temperature
16	Temp' sensor	Exhaust Temperature
17	Level switch	Water Level(L,M,H)
18	Level switch	Water Level(H/H)
19	Pressure sensor	Inlet Pressure
20	Pressure sensor	Exhaust Pressure
21	Position sensor	Inlet Valve Open/Close
22	EMO Push Button	Stop the power & Utility when emergency.

2-3. Burn-Wet(Feature)

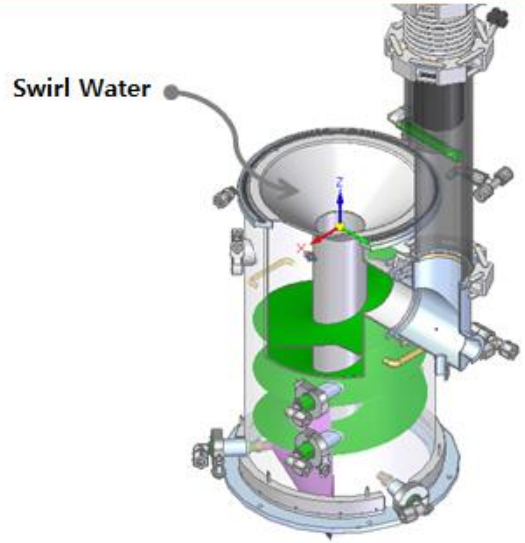
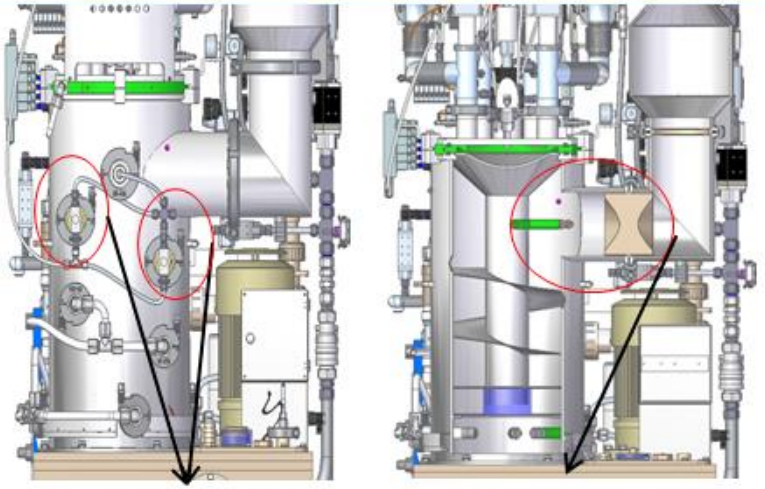




✓ Waste Gas Inlet
- Auto Cleaning Inlet Scraper (Option: Hot N2)
- Auto By-Pass V/V
- 1~6 Inlet Option

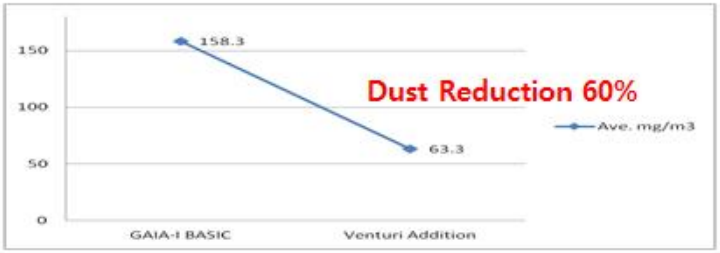
✓ Reactor
- Water Curtain (Powder Deposition prevention)
- Anti-Corrosion Material (Hastelloy C-276)

2-3. Burn-Wet(Feature)

GAIA-I	Venturi Addition
	

✓ **Anti Corrosive / Anti Powder Clogging**
- Water Curtain by Swirl Water

✓ **Usage of Atomizing Nozzle**
1) Fine spray Cooling : Cooling gas, Wates-Gas, By-product, etc.
2) Dust collection : Cement, Cokes, Remove glass raw material, Small particles and other find dusts



2-4. Burn-Wet(Utility)

Lists	Specification	Maximum setting The amount required		Connection	Remarks
		Single	Dual		
Power	A/C 208V(±10%) 3 Phases	Rupturing capacity: 20A Power: 7.2KW	Rupturing capacity: 40A Power: 14.4KW	3.5SQ * 4C	-
LNG	0.3 ~ 1.0 kg/cm^2	50 LPM	100 LPM	1/2" VCR Fitting (SUS)	1Port
O2	7 kg/cm^2	100 LPM	200 LPM	1/2" Tube (SUS)	1Port
GN2	7 kg/cm^2	100 LPM	200 LPM	1/2" Tube (SUS)	1Port
CDA	7 kg/cm^2	100 LPM	200 LPM	1/2" Tube (SUS)	1Port
CW (Fresh Water)	5 kg/cm^2	15 LPM	30 LPM	1/2" Tube (SUS)	1Port
PCW (Cooling Water)	5 kg/cm^2	50 LPM	100 LPM	3/4" Tube (SUS)	PCW-S,R 2Port
Drain Water	Acid Drain	15 LPM	30 LPM	25A (PP)	1Port
Gas Exhaust	-50 ~ -80mmH2O	1 m^3/min	1 m^3/min	MF100 Flange	Single 1Port / Dual 2Port
Cabinet Exhaust	-30 ~ -60mmH2O	2 m^3/min	2 m^3/min	MF100 Flange	Single 1Port / Dual 2Port

2-5. Burn-Wet(DRE performance)

Gas	Reaction	Efficiency
CF_4	$CF_4 + 2CH_4 + 8O_2 \rightarrow 4HF + 3CO_2 + 2H_2O$	≥ 95%
SF_6	$2SF_6 + 5CH_4 + 6O_2 \rightarrow 12HF + 2H_2S + 5CO_2 + 2H_2O$	≥95%
NF_3	$2NF_3 + 2.5CH_4 + 3.5O_2 \rightarrow N_2 + 6HF + 2.5CO_2 + 2H_2O$	≥ 95%
SiH_4	$SiH_4 + CH_4 + 4O_2 \rightarrow SiO_2 + CO_2 + 4H_2O$	≥ 99%
TEOS	$(C_2H_5O)_4Si + CH_4 + 14O_2 \rightarrow SiO_2 + 9CO_2 + 12H_2O$	≥ 99%
F_2	$2F_2 + 2CH_4 + 3O_2 \rightarrow 4HF + 2CO_2 + 2H_2O$	≥ 99%
C_2HF_5	$C_2HF_5 + 1.5CH_4 + 4O_2 \rightarrow 3.5CO_2 + 5HF + H_2O$	≥ 99%
Cl_2	$2Cl_2 + 2CH_4 + 3O_2 \rightarrow 4HCl + 2CO_2 + 2H_2O$	≥ 99%
BCl_3	$2BCl_3 + 2CH_4 + 4O_2 \rightarrow B_2O_3 + 6HCl + H_2O + 2CO_2$	≥ 99%
N_2O	$2N_2O + CH_4 + O_2 \rightarrow 2N_2 + CO_2 + 2H_2O$	≥ 90%
WF6	WF6 + 2CH4 + 4O2 = WO3 + 2CO2 + 6HF + H2O	≥ 99%
HF	Water Soluble	≥ 99%
HCl	Water Soluble	≥ 99%
NH_3	Water Soluble	≥ 99%
$SiCl_4$	Water Soluble	≥ 99%
ClF_3	Water Soluble	≥ 99%

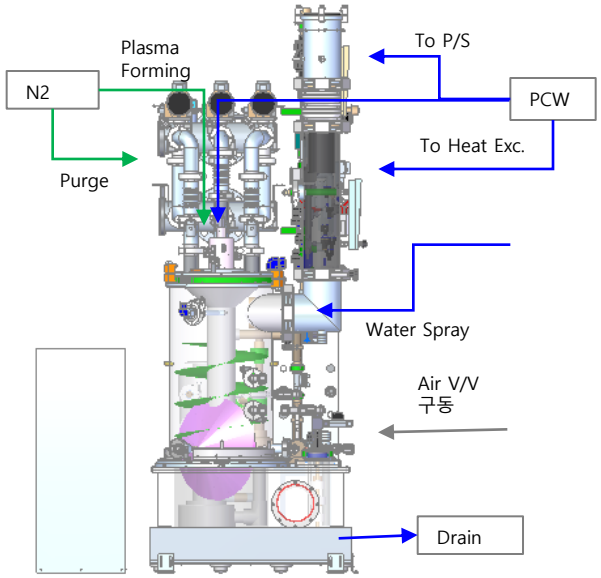
3-1. Plasma-Wet

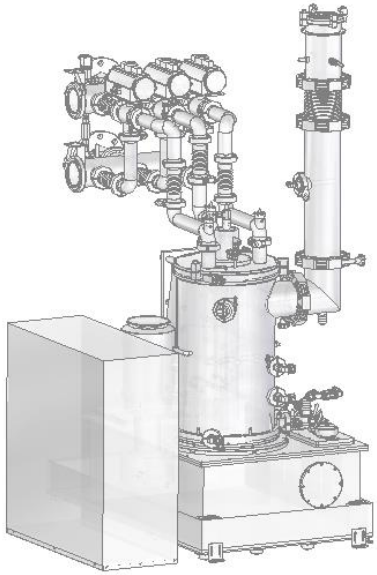
Single

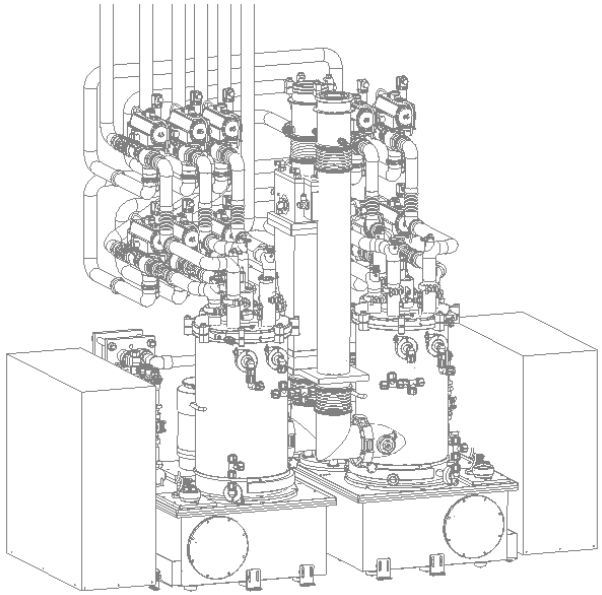
Principle	Plasma & Wet Type
Model	GAIA-P
Dimension	1000(W) x 1000(D) x 1950(H) mm
Application	Semiconductor & LCD process
Inlet Qty	Max 6
Weight	700 kg
Total Flow capa	800slm
Based on inlet(N2)	CF4 90% (200lpm based on total flow), NF3 95% (600lpm based on total flow)

Dual

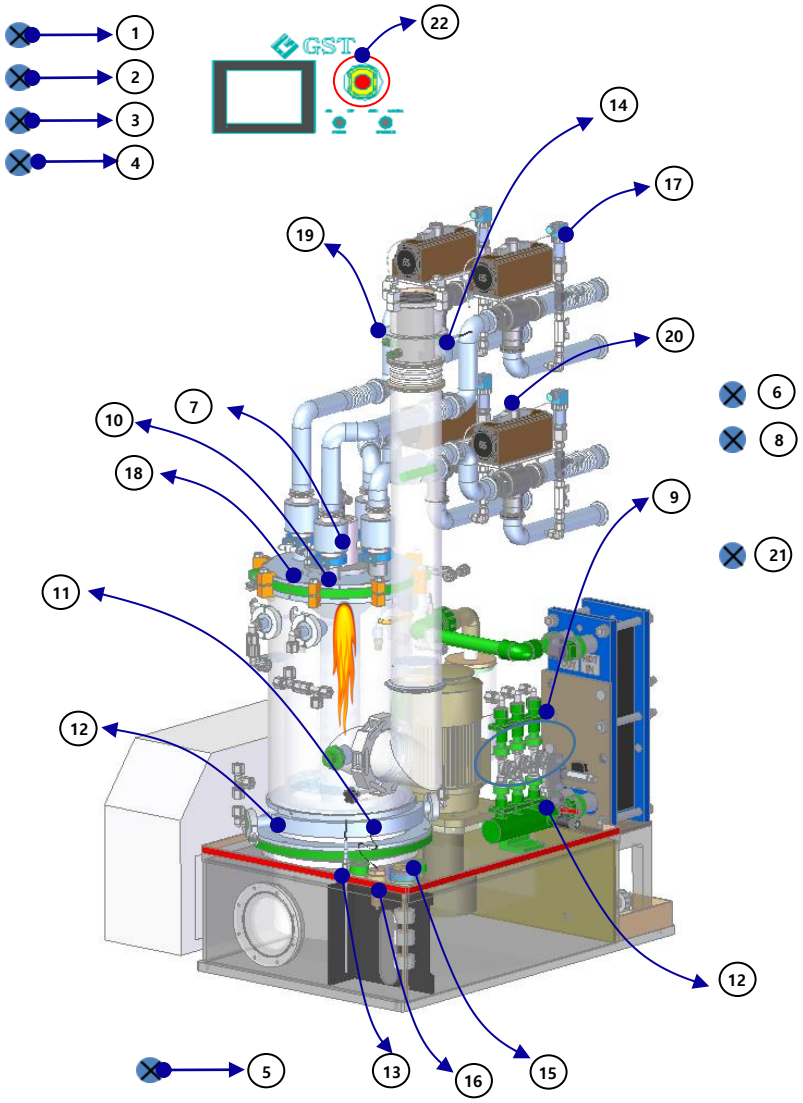
Principle	Plasma & Wet Type
Model	GAIA-P DUAL
Dimension	1824(W) x 1100(D) x 1810(H) mm
Application	Semiconductor & LCD process
Inlet Qty	Max 6+6
Weight	1100 kg
Total Flow capa	800*2slm
Based on inlet(N2)	CF4 90% (200lpm based on total flow), NF3 95% (600lpm based on total flow)







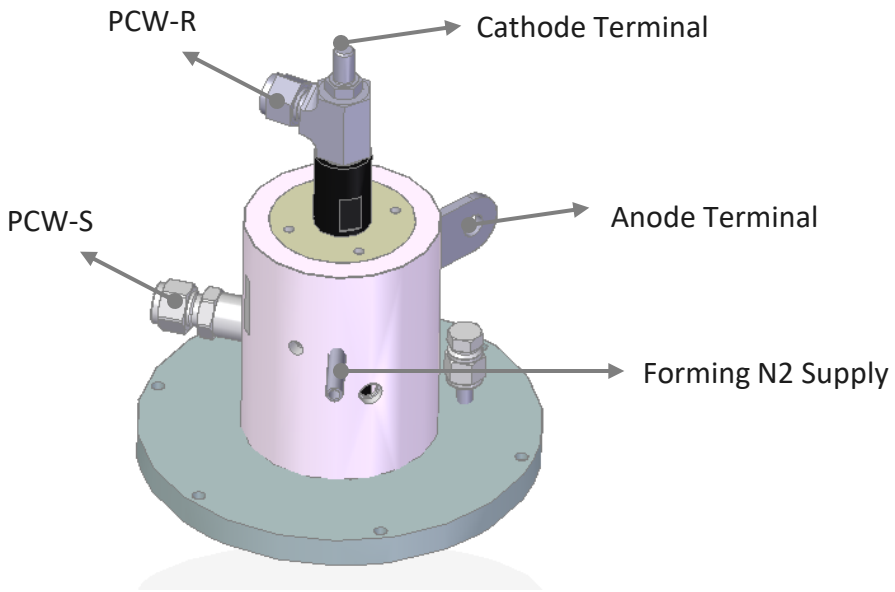
3-2. Plasma-Wet(Interlock Design)



NO.	NAME	FUNCTION
1	Pressure' switch	Cabinet Exhaust Pressure
2	Door Open	Door Open
3	Smoke detector	Fire Detection
4	Leak sensor	Liquid Water Leak
5	Leak sensor	Cabinet Water Leak
6	Flow sensor	PCW Flow
7	Flow sensor	Torch PCW FlOW
8	Flow sensor	CW Flow
9	Flow sensor	Circulation Water Flow
10	Temp' switch	Torch Temperature
11	Temp' switch	Reactor Temperature
12	Temp' sensor	Circulation Water Temp'
13	Temp' sensor	Tank water Temperature
14	Temp' sensor	Exhaust Temperature
15	Level switch	Water Level(L,M,H)
16	Level switch	Water Level(H/H)
17	Pressure sensor	Inlet Pressure
18	Pressure sensor	Reactor Pressure
19	Pressure sensor	Exhaust Pressure
20	Proximity sensor	Inlet Valve Open/Close
21	MFC	N_2 Flow
22	EMO Push Button	Emergency State

3-3. Plasma-Wet(Feature)

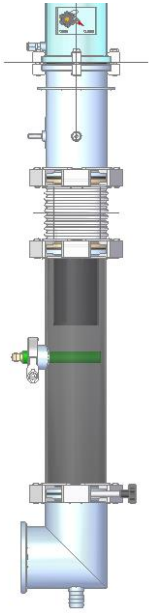
- Plasma Torch
  - -. Applying the N2 Vortex and permanent magnet
  - -. Supply the cooling water line to the Cathode and Anode
  - -. Cathode , Anode , Torch Housing : 3 structure
  - -. Excellent thermal efficiency of 80%. (Generally 50~60%)
  - -. Optimization the cooling efficiency
  - -. Cathode : Tungsten , Anode : Oxygen-free copper, Housing: SUS



➢ **Plasma Jet Feature**

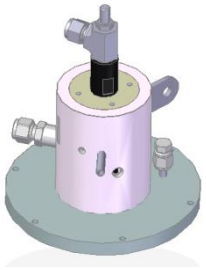
@ N2 45slm, 13kW

3-3. Plasma-Wet(Feature)



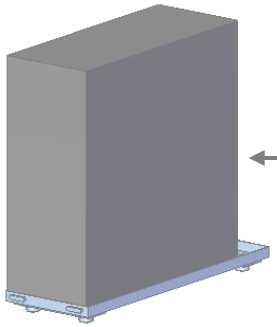
-Standard-
<Exhaust>

<Electrical Unit>

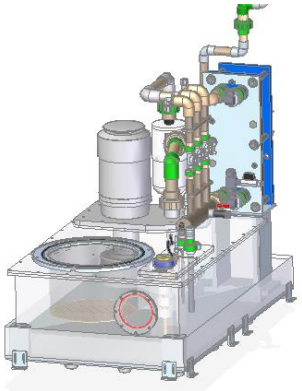


<Plasma Torch>

<Reactor>



<Plasma Generator>



<Water Tank>

3-4. Plasma-Wet(Utility)

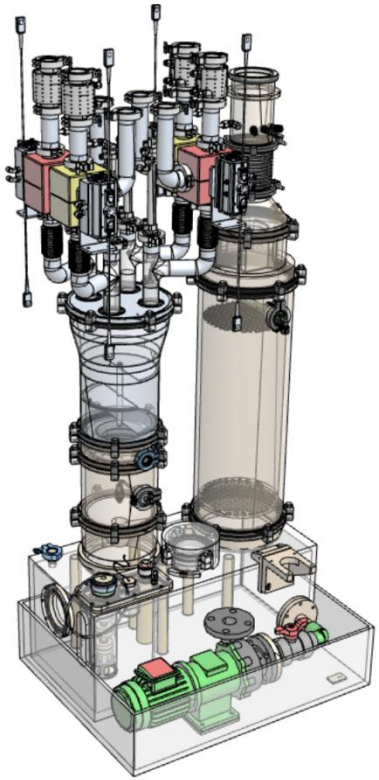
Utility	Standard	Max. usage		Ave. Usage		Remarks
		Single	Dual	Single	Dual	
Power	A/C 208V 3 Phase	100A (20KW)	200A (40KW)	ELCB 100A (10KW)	ELCB 200A (20KW)	60SQ * 4C
CDA	5 ~ 6.5 kg/cm^2	100LPM	200LPM	1/2" Swagelok	1/2" Swagelok	-
GN2	3 ~ 6 kg/cm^2	100 LPM	200 LPM	1/2" Swagelok	1/2" Swagelok	-
City Water	3 ~ 6 kg/cm^2	15 LPM	15LPM x2	1/2" Swagelok	1/2" Swagelok x 2 Ports	-
Cooling Water	3 ~ 6 kg/cm^2	50 LPM	50LPM x2	3/4" Tube (SUS)	3/4" Tube x2Ports (SUS)	PCW-S,R
Drain Water	Acid Drain	15 LPM	15LPM x2	15A Pipe (PVC)	15A Pipe x2 Ports (PVC)	-
Gas Exhaust	-50 ~ -80mmH_2O	2 m^3/min	2x2 m^3/min	MF100 Flange (100A Pipe)	MF100 Flange x 2Ports (100A Pipe)	-
Cabinet Exhaust	-30 ~ -60mmH_2O	2 m^3/min	4 m^3/min	MF100 Flange (100A Pipe)	MF100 Flange (100A Pipe)	-
Gas Inlet	n/a			-	KF 40	1~6 Port (user Option)

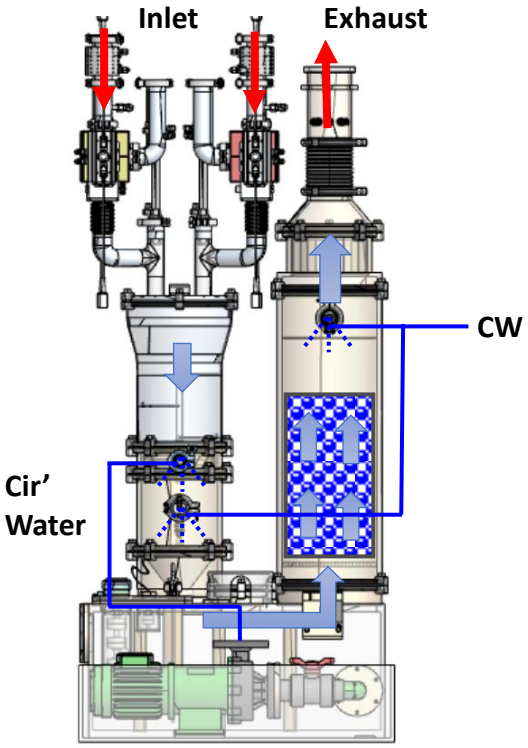
3-5. Plasma-Wet(DRE performance)

Gas	Reaction	Efficiency
CF4	$CF_4 + 2H_2O \rightarrow CO_2 + 4HF$ $CF_4 + O_2 \rightarrow CO_2 + 2F_2$	≥ 95%
SF6	$SF_6 + 3H_2O \rightarrow SO_3 + 6HF$ $SF_6 + O_2 \rightarrow SO_2 + 3F_2$	≥ 98%
NF3	$2NF_3 \rightarrow N_2 + 3F_2$	≥ 99%
H2	$2H_2 + O_2 \rightarrow 2H_2O$	≥ 99%
PH3	$2PH_3 + 3O_2 \rightarrow P_2O_5 + 3H_2O$	≥ 99%
DCS(SiH2Cl2)	$SiH_2Cl_2 + 3/2O_2 \rightarrow SiO_2 + H_2O + Cl_2$	≥ 99%
TEOS	$(C_2H_5O)_4Si + 12O_2 \rightarrow 8CO_2 + SiO_2 + 10H_2O$	≥ 99%
WF6	$2WF_6 + 3/2O_2 \rightarrow W_2O_3 + 6F_2$	≥ 99%
B2H6	$B_2H_6 + 3O_2 \rightarrow B_2O_3 + 3H_2O$	≥ 99%
SiH4	$SiH_4 + 2O_2 \rightarrow SiO_2 + 2H_2O$	≥99%
NH3	Water Soluble	≥ 99%
HCl	Water Soluble	≥ 99%
HF	Water Soluble	≥ 99%
SiCl4	Water Soluble	≥ 99%
ClF3	Water Soluble	≥ 99%

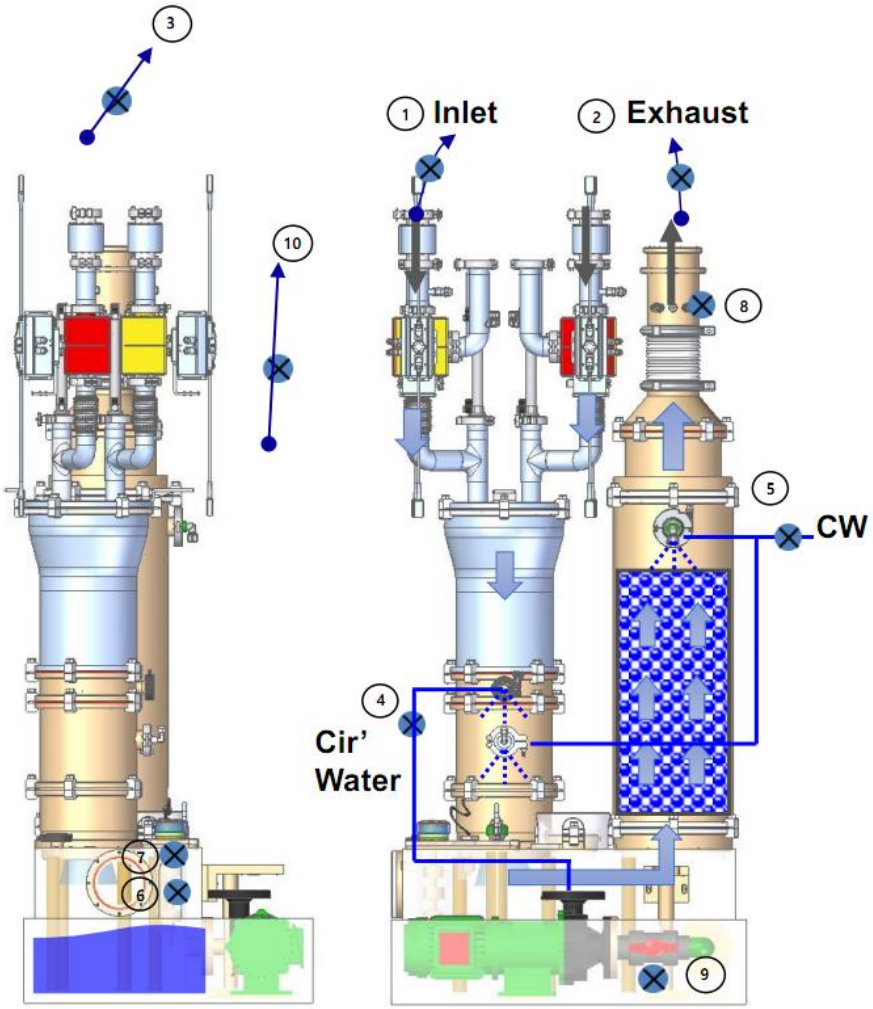
4-1. Wet

Principle	Wet Type
Model	SWS-I
Capacity	1000LPM
Dimension	750(W) x 900(D) x 1800(H) mm
Application	Wet Cleaning
Weight	550Kg





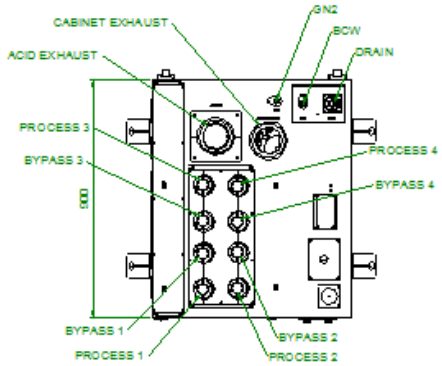
4-2. Wet(Interlock Design)

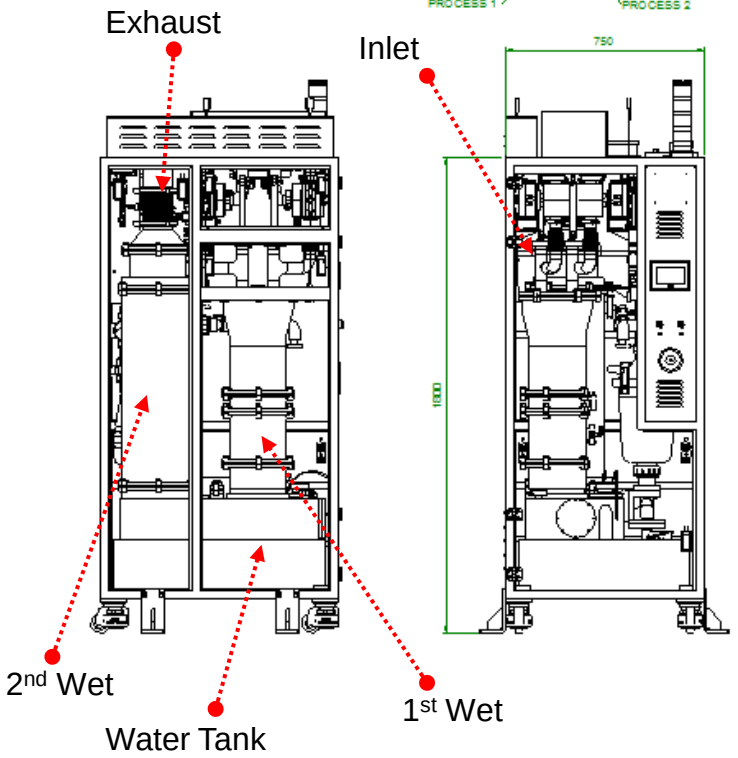


Left Front

No	Warning/Alarm	Condition	Interlock
1	Inlet Pressure High	> 60mmH_2O	Alarm
2	Exhaust Pressure High	> -10mmH_2O	Alarm
3	Cabinet Pressure High	< 20Pa(N/m^2)	Alarm
4	Circulation Flow Low	< 10LPM	Alarm
5	CW Flow Low	< 3LPM	Alarm
6	Water Level Low	Low Level	Alarm
7	Water Level High-High	High-High Level	Alarm
8	Temp High	Temp high > 45°C	Alarm
9	Water Leak	Leak	Alarm
10	Door Open	-	Alarm

4-3. Wet(Feature)





- ✓ **Inlet**
  - Inlet Pressure Sensor & N2 Purge
  - NW40 4 Port
  - Hot N2, Heat 3Way Valve, Heating Jacket, Scraper
- ✓ **1st , 2nd Wet Chamber**
  - Material : PVC
  - Circulation Water Spray & Venturi
  - Final CW Spray in 2nd Wet Chamber
- ✓ **Water Tank**
  - Material : PVC
  - Water Containment Capacity : 78Liter
  - Circulation Pump
  - Power Drain
  - Multi Cyclone
- ✓ **Exhaust**
  - Gas Liquid Seperate with Packing
  - MF100

4-4. Wet(Utility)

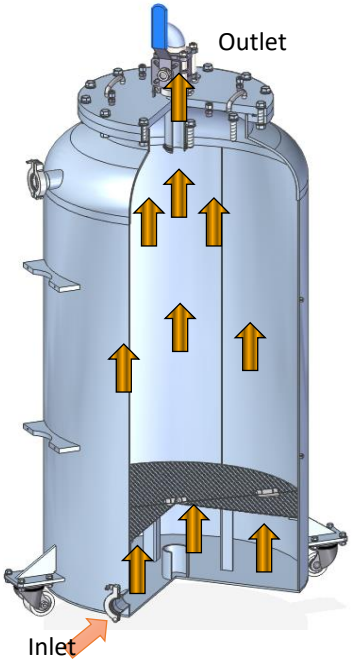
Utility	Standard	Up to Installation Requirements	Connection	Remarks
Power	A/C 208~230V 3 Phase	15A	3.5SQ * 4C (15A)	-
N2	5 ~ 6 kg/cm^2	200LPM	3/8” Swagelok (SUS)	1 port
City Water	3 ~ 6 kg/cm^2	15LPM	3/8” Swagelok (SUS)	1 port
Drain Water	Acid Drain	20-30 LPM (Normal: 15LPM)	Power Drain: 20A union (PVC)	1 port
Gas Exhaust	-60 ~ -100 mmH_2O	1000LPM	MF100 Flange	1 port
Cabinet Exhaust	-30~-60 mmH_2O	3 m^3/min	MF100 Flange	1 port
Gas Inlet	N/A		NW40	4 port

4-5. Wet(DRE performance)

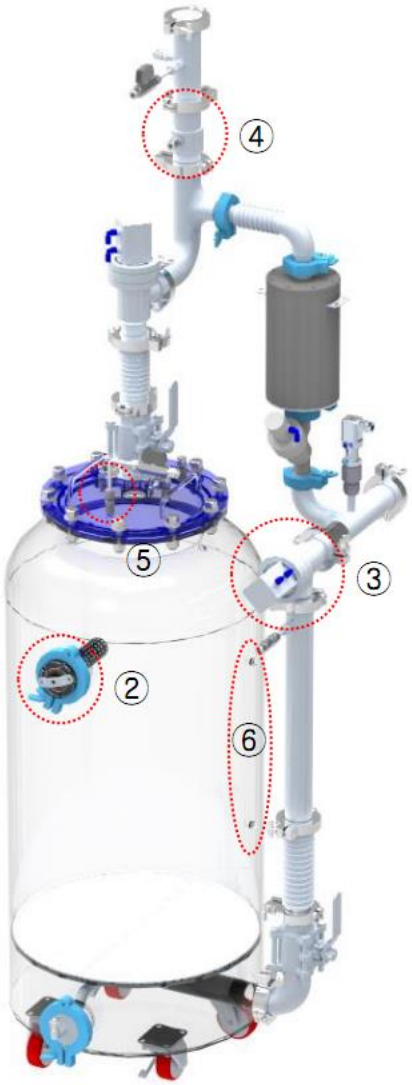
Gas	Reaction	Efficiency
HF	Water Soluble	≥ 99%
HCl	Water Soluble	≥ 99%
Cl_2	Water Soluble	≥ 99%
NH_3	Water Soluble	≥ 99%
$SiCl_4$	Water Soluble	≥ 99%
ClF_3	Water Soluble	≥ 99%

5-1. Dry

Scrubber type	Dry Type [SDS-500]
Capacity	150 slm
Cartridge Volume	80 Liter
Dimension	650(W) * 540(D) * 1650(H)mm
Application	Etch, Diffusion, Metal, Implant, Etc.
Weight	250 Kg



5-2. Dry(Interlock Design)



① Gas Monitor(Option)
- Scrubbing under the TLV

② 90% Color Sensor(resin 90% usage check function)
- If Resin 90% use warning occur

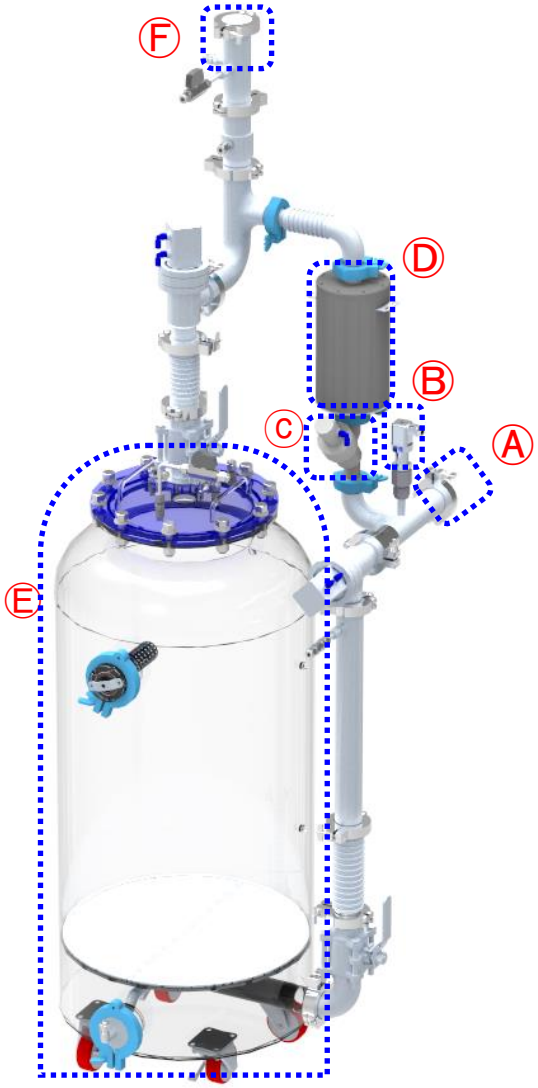
③ Pneumatic Valve (Double Acting Valve)
- Even if Momentary black out(1s↓) operate, System by-pass function

④ Pressure control system(Vacuum generator)
- Maintains constant pressure to prevent external leaks by operating below atmospheric pressure 760 Torr under)

⑤ Main Cartridge Relief valve(Cracking pressure : 0.03Mpa) applied
- When the pressure inside the cartridge rises, it automatically vents the pressure

⑥ Temperature Monitor System(70°C)
- When the temperature rises, perform N2 purge after switching the system by-pass

5-3. Dry(Feature)



Ⓐ Gas inlet

-. Process gas inlet port

Ⓑ Pressure sensor

-. When the measured value is displayed on the touch or exceeds the upper limit value, an alarm occurs and the device is converted to by-pass mode.

Ⓒ By-Pass Valve

-. In order to make the input gas do not pass through the input valve and the output valve, a by-pass device is realized

(Convert when an exception occurs in the system)

Ⓓ Mini cartridge

-. It can be used as a purification device during By-pass

Ⓔ Cartridge

-. Adsorption purification of target gas by filling an absorbent suitable for process gas.

Ⓕ Gas outlet

-. Discharge the purified gas.

5-4. Dry(Utility)

Utility	Standard	Up to Installation requirements	Average Usage	Connection	Remarks
Power	A/C 220V	Partition capacity: 5Ampere Electricity: 0.5KW	0.1KW	0.75㎟-3Wires	-
N2	4 ~ 7kg/cm^2	100 SLM	40SLM	3/8” Tube	Ejector when it using Normal 40LPM
Gas Exhaust	-50mmH2O ~ -100mmH2O	0.5 m^3/min	0.2 m^3/min	NW40 Flange	-
Cabinet Exhaust	-50mmH2O	2 m^3/min	1 m^3/min	Ø100mm	-

Thank you !

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