

ONSITE GENERATION (OSG) SODIUM HYPOCHLORITE

AGUATECH GeemBlue

Seres I and Series S



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Aquatech GeemBlue Series I & S

AguaTech GeemBlue Series I

AguaTech GeemBlue Series S

Salt Delivery – Series S

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Potential security risks

By chlorine gas



Hidden risks in
transportation

Hidden risks in
storage and
operation



Leakage may cause badly
security incidents

Chlorine Dioxide Generator



Chlorine dioxide is also a commonly disinfection way. The generation process is easy and it has strong disinfection ability

However, it has the same safety consideration as chlorine gas

Disadvantage

of Chlorine dioxide



The raw material hydrochloric acid is a hazardous chemical and it needs to be filed for purchase.

The disinfection by-products ClO_2^- and ClO_3^- have a great toxicological effect



Chlorine dioxide is unstable and may cause low level explosion

Advantage

Of Sodium Hypochlorite Generator

Salt		0.5~0.8% NaClO	
	Safe Raw Material	Safe Solution	
Water dilute	Safe Operation	Safe Dosing	Food grade standard
	Cheap Raw Material	Availability of Raw Material	



High Concentration Sodium Hypochlorite



High concentration sodium hypochlorite as an alternative to chlorine gas, is also begun to be widely used in water and waste water plant

It is more safety and require less maintenance

However, the application still have lots of limitations

Disadvantage

of high concentration sodium hypochlorite



Produce as by product
from chlor-alkaline
plant, hard to control
the quality

Big amount by-product
NaOH in the solution,
will cause the scale in
pipe



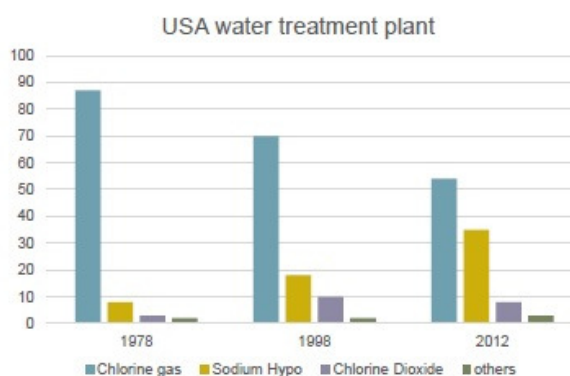
The concentration will be declined every
day, thus require higher dosage

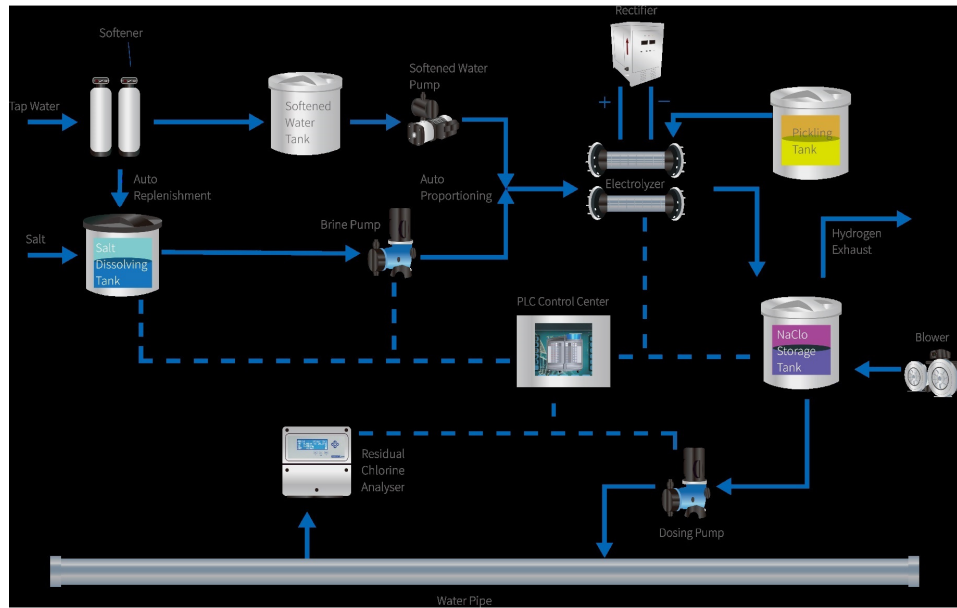
Much higher purchasing cost for per kg
active chlorine

Statistics in different disinfection way

for large and medium sized water plants in the United States

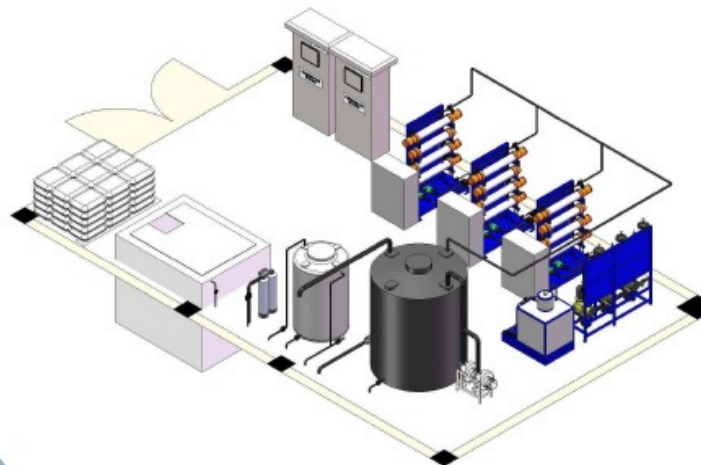
From the 1970s to the last 10 years sodium hypochlorite disinfection has replaced traditional chlorine gas disinfection in many water plant





**Disolving
Proportioning
Electrolysis
Storage
Dosing**

3D System layout



AGUA TECH GEEMBLUE series EC system

10~100 LPS water plant
(864~8640 m³/day)

I

Series



100~800 g/h
Active chlorine

150~10,000 LPS water plant
(12960 ~ 864000 m³/day)

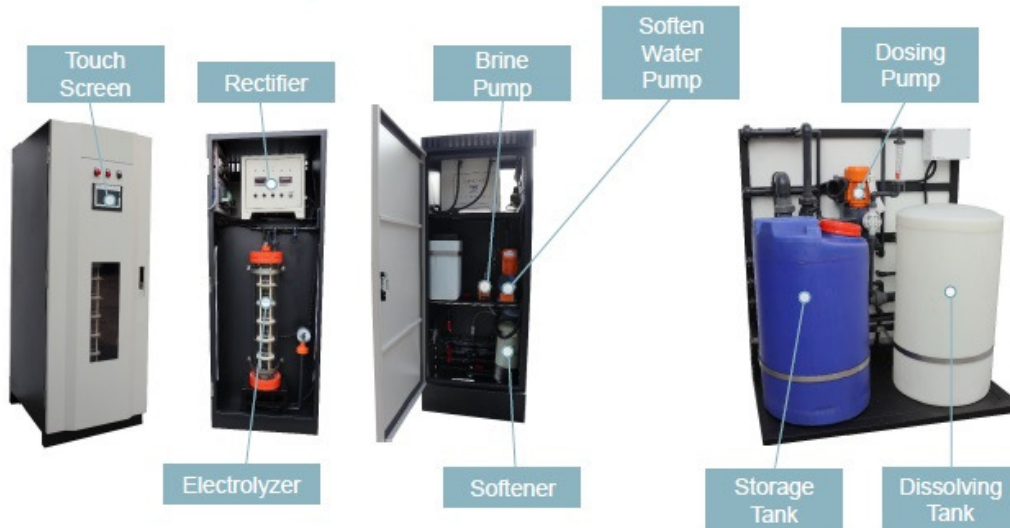
S

Series



1~50 kg/h
Active chlorine

"I" Series EC System



150~10,000 LPS water plant
(12960 ~ 864000 m³/day)

S

Series



1~50 kg/h
Active chlorine

“S” Series EC System



Electrolyzer



Touch
Screen



Brine
Proportioning
Unit

Salt Delivery

Deliver salt to dissolving tank or dissolving pool



Water Softening



Proportioning Unit



MILTONROY / PROMINENT /
SEKO / GRUNDFOS Pumps

Damper, back pressure Valve,
safety Valve, Flow meter, etc

Precision filter , remove
impurity in saturated brine

Electrolytic Cell

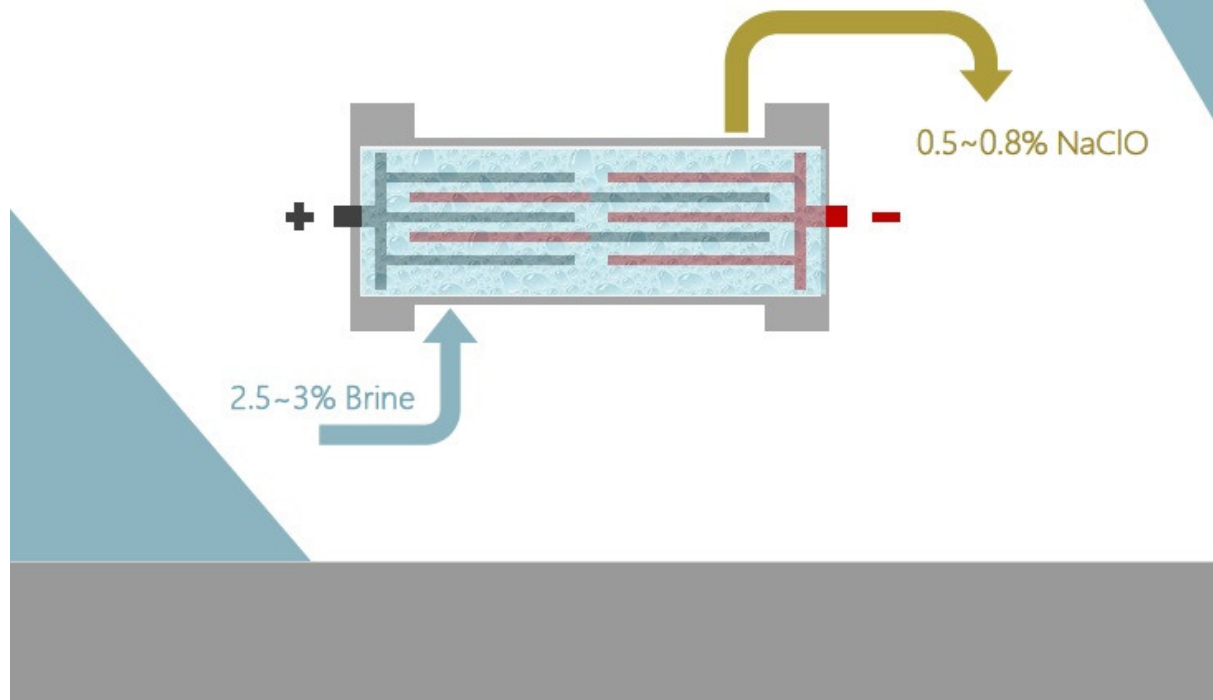


- MAGNETO Series electrode
- Pure Titanium (TA1) electrode
- Rh-Ru-Ir oxide fine nano coating
- Electrode spacing 1.5mm

- Transparent cell
- High strength organic glass material, anti-pressure > 0.6 Mpa

- Enhance lifetime test > 100 hours,
- Equivalent 50000 hour (**6 years**) life time

Running Process



Rectifier



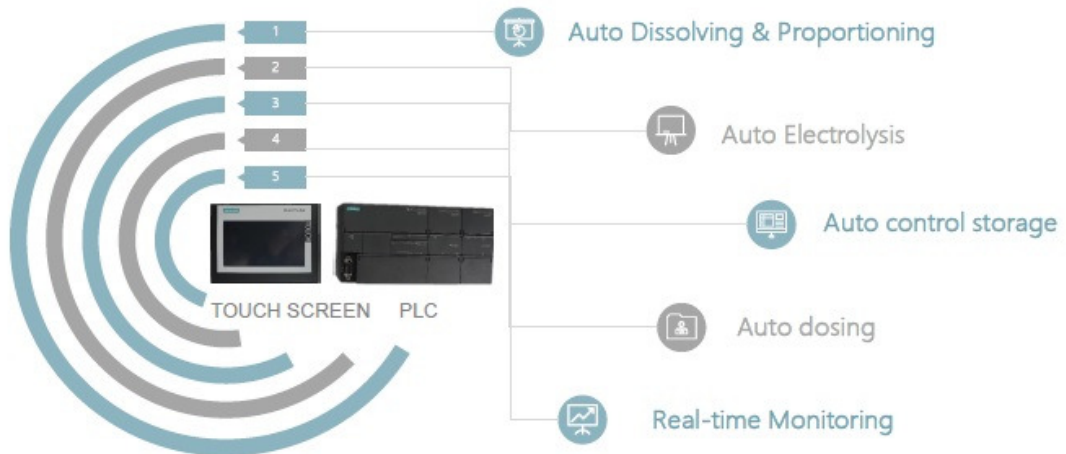
High frequency ,stability and
constant current rectifier

Electrical conversion efficiency
over 90%



Multiple protection for input
over/under voltage, and output
overvoltage / overcurrent /
short circuit protection as well
as overheat protection

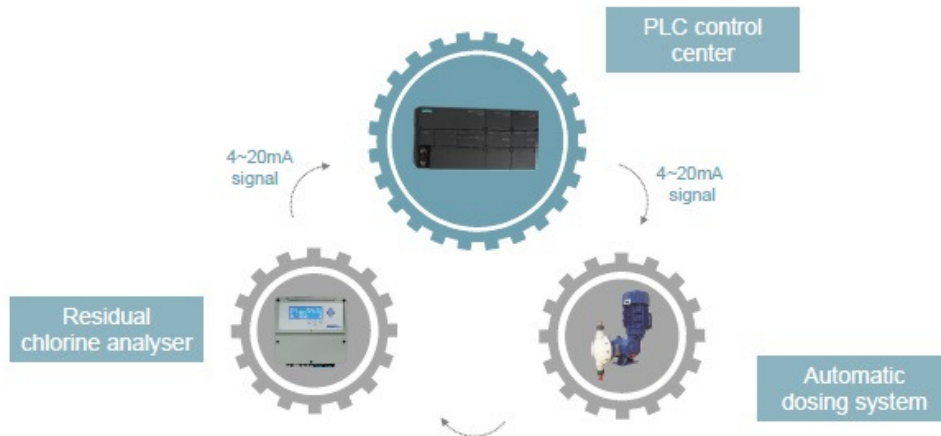
Siemens PLC Smart Control Center



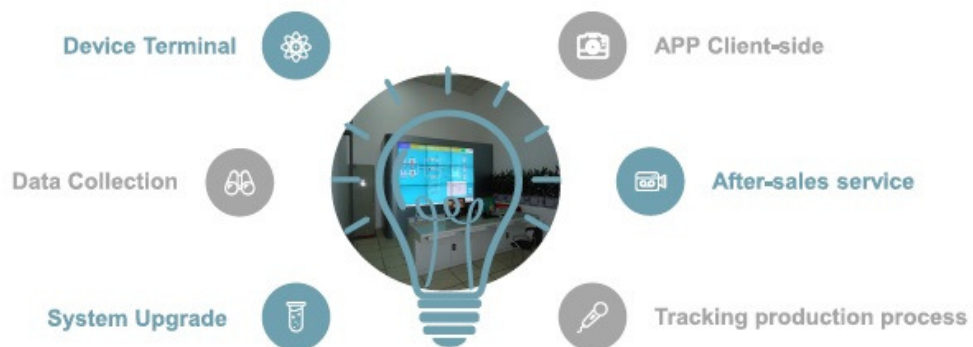
LCD Touch Screen



Closed-loop Dosing Control



Intelligence Platform



Multi-protection For Hydrogen Exhaust

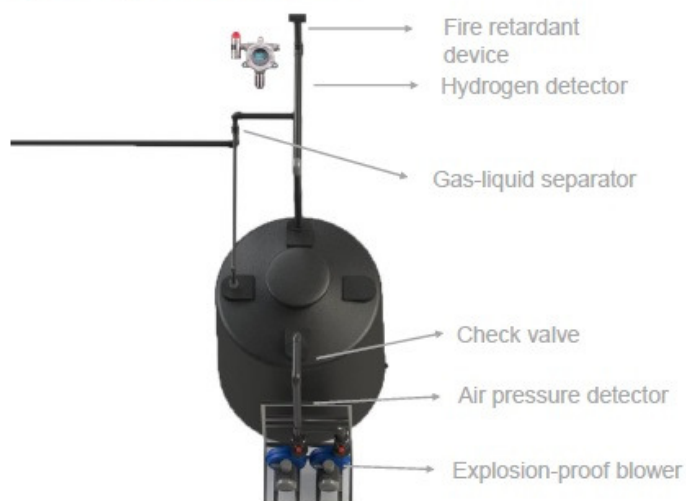
Multi-stage hydrogen discharge

Explosion-proof blower

Hydrogen detection

Air pressure detection

Fire retardant design



Multi-protection For The System

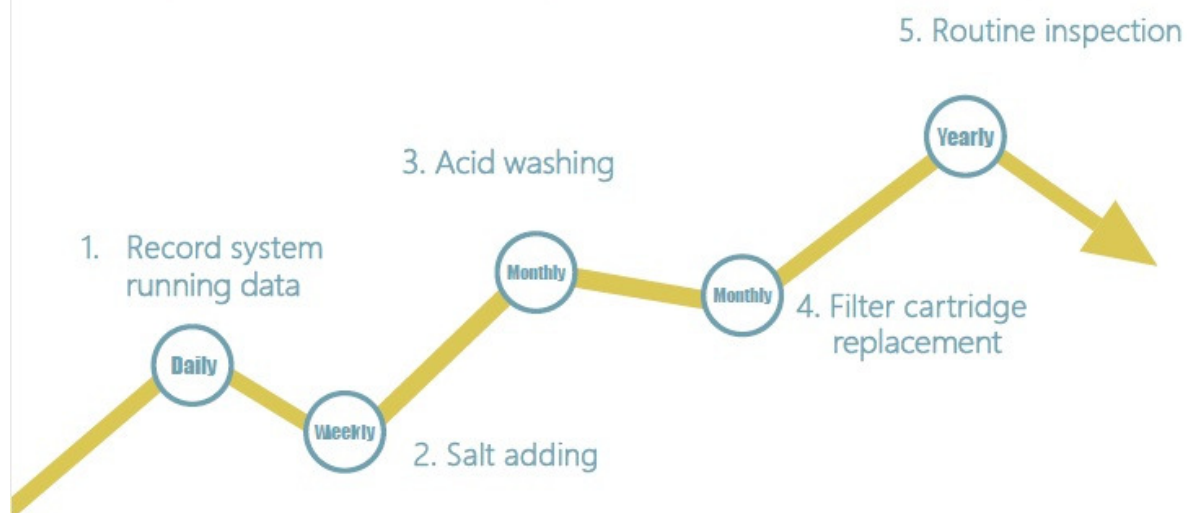
- Conductivity meter
- Temperature Sensor
- Flow Sensor



- Acid washing system
- Cooling & heating System



Daily maintenance for operator



Benefit of AGUA TECH Geemblue EC system

01

High Safety Level

Food grade standard solution, multi-protection for each components, multi-protection for hydrogen exhaust

02

Low Running Cost

To produce 1 kg available chlorine, only cost 3.5kg salt, 4kwh DC power

03

Full Automatic Operation

Full computer program and central control by PLC, the staff can operate after simple training

04

Accuracy Control Dosing

Closed loop control system, ensure accuracy residual chlorine in water and make use of every drop of solution

Running Cost Analysis

Example:

500 LPS (43,200 m³/day) drinking water plant

Pre-chlorination: 3ppm(g/m³) Post-chlorination: 2ppm(g/m³)

Total: 5ppm(g/m³) chlorine dosing rate

01

Chlorine Gas

Chlorine consumption: 216kg/day
 Concentration of chlorine gas: 99%
 Chlorine gas Price: 1.3 USD/kg
 Running cost: 280.8 USD/day

Running cost
102,492 USD/year

02

10% Hypo

Chlorine consumption: 216kg/day
 Concentration of sodium hypo: 10%
 10% hypo Price: 0.24 USD/kg
 Running cost: 518.4 USD/day

Running cost
189,216 USD/year

03

Onsite EC System

Chlorine consumption: 216 kg/day
 Salt consumption: 756 kg/day
 Power consumption: 1,080 kwh/day
 Salt Price: 0.15 USD/kg
 Power Price: 0.1 USD/kwh
 Running cost: 221.4 USD/day
 Running cost

80,811 USD/year

Conclusion





A very large project in South Korea

Drinking water plant



Water flow: 400,000m³/day (4630 LPS)
Capacity: 30kg/h*3(two duty one standby)
Chlorine concentration: 8000ppm
Dosing rate: 4ppm
Control: PLC control/full automatic
Salt consumption: 3.5 kg/kg Cl₂
Energy consumption: 4kwh/kg Cl₂

Malaysia

Drinking water plant



Water flow: 17,000m³/day (197 LPS)
Capacity: 3kg/h*2(one duty one standby)
Chlorine concentration: 8000ppm
Dosing rate: 4ppm
Control: PLC control/full automatic
Salt consumption: 3.5 kg/kg Cl₂
Energy consumption: 4kwh/kg Cl₂

Guizhou

Drinking water plant



Water flow: 40,000 m³/day (550 LPS)
Capacity: 2kg/h (two duty one standby)
Chlorine concentration: 8000ppm
Dosing rate: 2ppm
Control: PLC control/full automatic
Salt consumption: 3.5 kg/kg Cl₂
Energy consumption: 4kwh/kg Cl₂

UZBEKISTAN

Water plant



Water flow: 45,500 m³/day (527 LPS)
Capacity: 5kg/h*2(one duty one standby)
Chlorine concentration: 8000ppm
Dosing rate: 2ppm
Control: PLC control/full automatic
Salt consumption: 3.5 kg/kg Cl₂
Energy consumption: 4kwh/kg Cl₂

Iran

Waste water plant



Water flow: 5,000m³/day (58 LPS)
Capacity: 800g/h*2(one duty one standby)
Chlorine concentration: 8000ppm
Dosing rate: 3ppm
Control: PLC control/full automatic
Salt consumption: 3.5 kg/kg Cl₂
Energy consumption: 4kwh/kg Cl₂