



SODIUM HYPOCHLORITE GENERATOR
CN/CM-SERIES WATER TREATMENT EQUIPMENT
ELECTRODE CHLORINATION SYSTEM

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On-site Sodium Hypochlorite Generator

Brief introduction of sodium hypochlorite

Sodium Hypochlorite is a member of the chlorine family of disinfectants. It is made up of the elements: sodium, oxygen, and chlorine and is formed from salt and water.

Sodium hypochlorite, is a strong oxidizing agent with strong bactericidal and bleaching ability, have been widely using in drinking water disinfection, food processing, industrial or power system circulating water disinfection, hospital or sewage treatment, shipyard water treatment

Chemnum Enhanced Operation

Chemnum has significantly improved on-site hypochlorite generation technology through an enhanced proprietary electrode coating. The coating, which the company has researched and developed since 2005, provides greater operational efficiency, significantly reducing the consumption of salt and electricity.

The electrolytic cell consists of vertical titanium plates divided into arrays of cell packs consisting of an equal number of anodic and cathodic plates. The electrolytic cell packs are configured electrically and hydraulically in series.

The electrolytic cell is fed a DC current from a rectifier and electrolyzes the diluted brine into a sodium hypochlorite (chlorine bleach) at a 0.8% solution. (As a reference, bottled household bleach is typically delivered at a 5% to 6% solution.) In simple terms, the process can be described as follows:



salt + water + electricity = sodium hypochlorite + hydrogen gas

The enhanced electrode coating reduces salt and energy consumption:

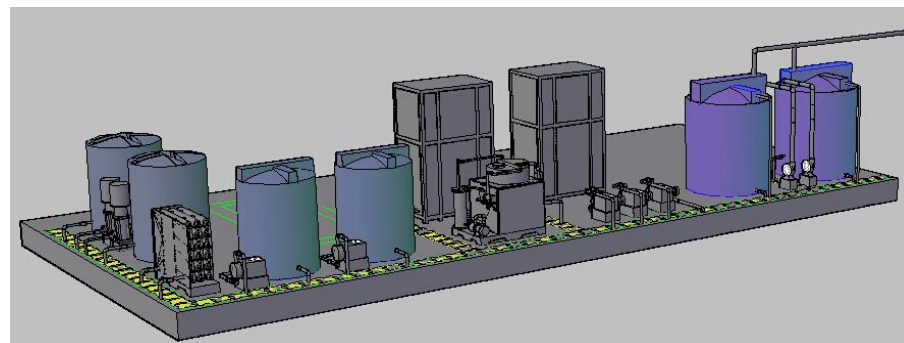
- ◆ Reduced salt consumption to as low as 3.0kg/l.kg of chlorine
- ◆ Reduced energy consumption to as low as 4.0 kwh/l.kg of chlorine

On-site Generating Process

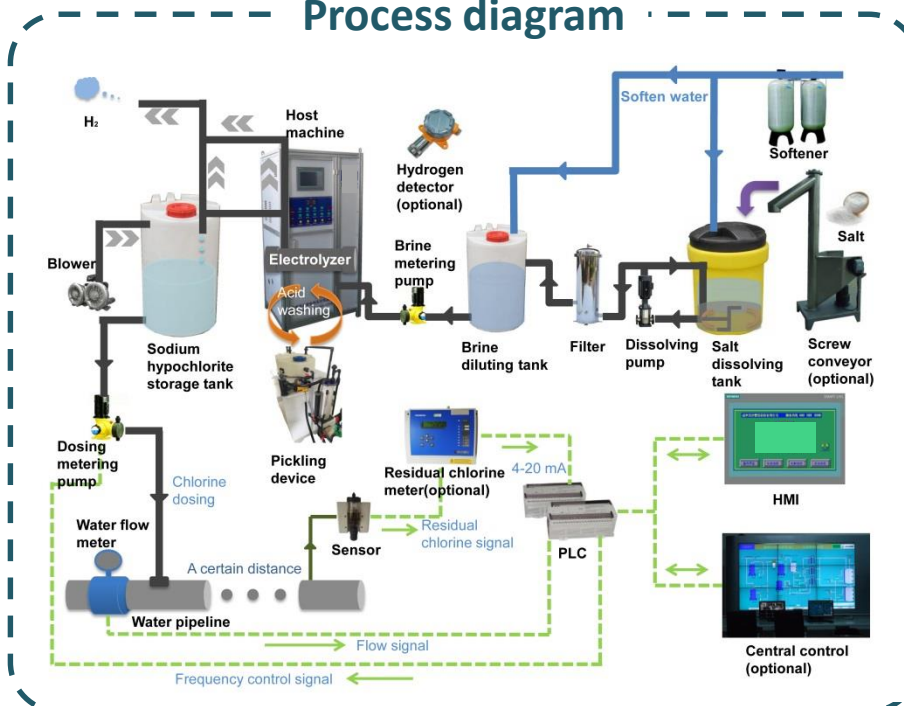
The operation of the electro chlorination system is straightforward:

- ◆ Influent water is passed through a water softener to reduce hardness therefore reducing the scaling of electrodes and lengthening the intervals between cleanings
- ◆ Using softened water, salt is dissolved in a tank to form a concentrated brine solution
- ◆ The diluted brine solution is passed through an electrolytic cell that, using DC current from a rectifier, electrolyzes the diluted brine into a 0.8% solution of sodium hypochlorite
- ◆ The 0.8% hypochlorite solution flows into a storage tank
- ◆ Hydrogen, the only byproduct of the process, is safely vented to the atmosphere.

3D System diagram



Process diagram



Integrated Sodium Hypochlorite Generator

Main components:
CHEMNIUM patented electrolyzer, Siemens LCD touch screen, Siemens PLC, SEKO metering pump, high frequency voltage constant current power supply, Precision filter, Softener, etc.



CN-50

CN-100 ~ CN-500



Model	Size	Cl ₂ production	Concentration	Salt consumption	Power consumption
	L*W*H mm	g/h	ppm	g/h	w/h
CN-50	1320×820×1180	50	8000	≤150	≤200
CN-100	1800×1000×1180	100	8000	≤300	≤400
CN-200	1800×1000×1180	200	8000	≤600	≤800
CN-300	1980×1280×1260	300	8000	≤900	≤1200
CN-400	1980×1280×1260	400	8000	≤1200	≤1600
CN-500	1980×1280×1260	500	8000	≤1500	≤2000

Features:

- ◆ Compact type design, small space occupation
- ◆ Full automatic operation, one time salt feeding can meet the demand of 5-7 days
- ◆ Automatic descale patent, pickling free.

Application:

- ◆ Small village water treatment plants
- ◆ Small water pump station
- ◆ Large Aquatics and Swimming pool
- ◆ Ballast water for vessel
- ◆ Food & Beverage Processing

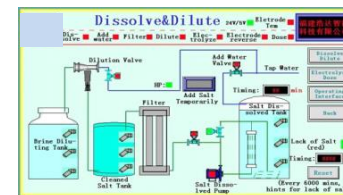
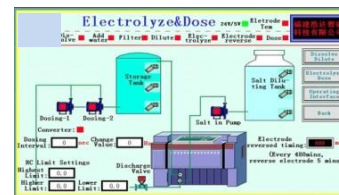
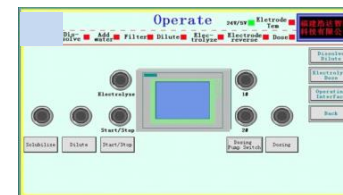
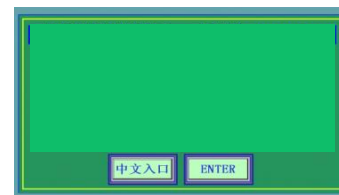


Interface of LCD touch screen and control panel



Control cabinet internal view

Interface of touch screen



Mongolia swimming pool disinfection project



Model: CN-200

Vietnam swimming pool disinfection project

Chlorine production:
200g/h
Function:
swimming pool circulation water disinfection
Running method:
fully automatic/PLC control
Range of residual chlorine:
0.3~0.5 ppm

Georgia small water treatment plant chlorination



Model: CN-100

Chlorine production:
100g/h
Function:
Water treatment plant chlorination
Running method:
fully automatic/PLC control
Range of residual chlorine:
0.5~0.7 ppm

Fuzhou airport pump station supplementary chlorination

Chlorine production:
200g/h
Function:
pump station supplementary chlorination
Running method:
fully automatic/PLC control
Range of residual chlorine:
0.2~0.4 ppm

Model: CN-200

Split Type Sodium Hypochlorite Generator

Main Components:
CHEMNIUM patent electrolyzer, Siemens LCD touch screen, Siemens PLC, SEKO metering pump, high frequency voltage constant current power supply, Precision filter, Softener, pickling system, etc.



Model	Size	Cl ₂ production	Concentration	Salt consumption	Power consumption
	L*W*H mm	kg/h	ppm	kg/h	Kw/h
CM-1K	900×700×1780	1	8000	3	4
CM-2K	1200×860×1950	2	8000	6	8
CM-5K	1200×860×1950	5	8000	15	20
CM-10K	1200×860×1950	10	8000	30	40
CM-30K	1760×960×1980	30	8000	90	120
CM-60K	2300×960×1980	60	8000	180	240

Features:

- ◆ The related component can be customized
- ◆ Flexible combination modes and free collocation depends on the requirement of project
- ◆ Central control of real-time monitor

Application:

- ◆ Municipal water & waste water plants
- ◆ Oil & power plant
- ◆ Food & Beverage Processing
- ◆ Cooling Tower & Recycling Water treatment



Interface of LCD touch screen

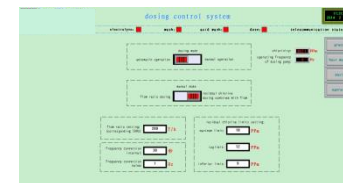
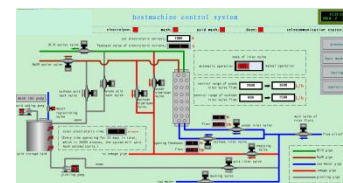
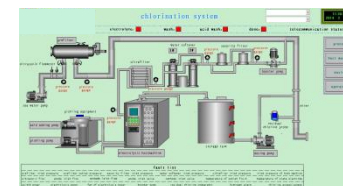
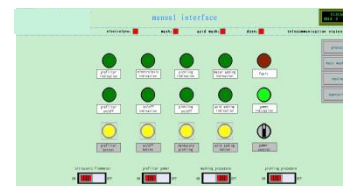


Interface of Control panel



Control cabinet internal view

Interface of Touch screen



Application case

Malaysia water treatment plant chlorination



Model: CM-1.5K × 2
(1 duty 1 standby)

Chlorine production:
2kg/h
Function:
Water treatment plant chlorination
Running method:
fully automatic/PLC control
Range of residual chlorine:
1~1.5 ppm

Hunan waste water treatment plant disinfection



Model: CM-30K × 2
(1 work 1 standby)

Chlorine production:
30kg/h
Function:
Waste water disinfection and ammonia nitrogen removal
Running method:
fully automatic/PLC control
Range of residual chlorine:
0.3~0.5 ppm

2011 Universiade water treatment plant project



Model: CM-5K × 2
(1 duty 1 standby)

Chlorine production:
5kg/h
Function:
Water treatment plant chlorination
Running method:
fully automatic/PLC control
Water treated amount:
5000ton/h

Seawater chlorination system



Model: CM-10K

Chlorine production:
10kg/h
Function:
Seawater make sodium hypochlorite and disinfection
Range of residual chlorine:
0.3~0.5 ppm
Dosing rated:
2ppm continuous dosing, 5ppm shock dosing

HMI & PLC



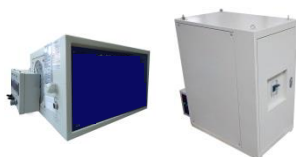
- ◆ **Siemens LCD touch screen:** All running status are shown clearly and all parameters can be adjusted directly by the touch screen
- ◆ **Siemens PLC control center:** Every step of the whole system is detected and controlled by the smart PLC center, safety, reliability

Electrolytic cell

- ◆ **pure titanium electrode** – ensure long service life >18 years
- ◆ **25 times ruthenium iridium oxide coating, 20um coating thickness** – ensure lower power and salt consumption, high chlorine production and long life
- ◆ **3mm gap between anode and cathode** – anti-scale design, 60% Less scaling



Power supply



- ◆ High-frequency, stability and constant current power specialized for **marine-level** electrolytic power
- ◆ **Antiseptic, moisture-proof, dust-proof**, input overvoltage, under voltage, default phase, output overvoltage, over current, short circuit and overheat protection;
- ◆ Electric conversion efficiency: **≥92%**;

- ◆ Anti-corrosive aluminum material as support of host machine
- ◆ Oxidation treatment
- ◆ Resistant of salty atmospheric corrosion
- ◆ 15 years long life as good as new



Frame work

Other components



Screw conveyor



Metering dosing pump



Conductivity monitor



Hydrogen blower



Hydrogen detector

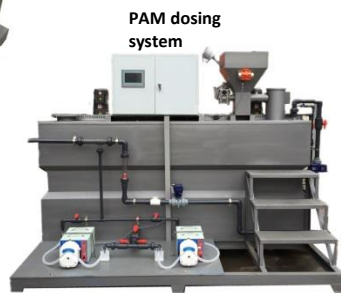


Temperature controller

Automatic Dosing Device



Sodium hypochlorite dosing system



PAM dosing system

Application scope:

CN-DOSE intelligent dosing system is designed to apply in transporting many kinds chemical like Sodium hypochlorite liquid, PAC, Alums, Caustic soda flakes, and Anti-sludging agent in water treatment process. Variable-frequency metering pump to dose through positive pressure, continuously dosing, close-loop feedback adjust automatically, control accurately.

Parameter

Material of tank: food grade PE

Volume of tank: 5L to 10T

Dosing pump: metering pump

Dosing amount: 1L/H to 5000L/H

Working method: can run alone or combination

Configure instrument: according to the actual requirement

Dissolved agitator: according to the actual requirement

Control method: dosing according to the PLC or timer

Sodium Hypochlorite Dosing System

Consists of storage tank, dosing metering pump, control panel, level gauge, flow meter, damper, valves and pipes. All components assemble and mount on the anti-corrosion UPVC base. We can design according to client's requirement. To meet different process requirements, it can transport chemicals(one or many kinds) to the liquid(one or many kinds).

PAM Dosing System

Consists of storage tank, dosing metering pump, control panel, level gauge, flow meter, damper, valves and pipes. All components assemble and mount on the anti-corrosion UPVC base. We can design according to client's requirement. To meet different process requirements, it can transport chemicals(one or many kinds) to the liquid(one or many kinds).

Features & Advantages:

- ◆ Three-grooves auto control dosing equipment
- ◆ Siemens PLC
- ◆ Touch screen, visual operation and setting
- ◆ Powder input auto-calculation
- ◆ Auto-dosing system, adjusted by PLC according to real-time flow rate
- ◆ All-in-one design, easy installation and commissioning
- ◆ 304 Stainless steel with anti-corrosion treatment
- ◆ Adjustable concentration setting for final solution

Application scope

- ◆ Municipal water supply
- ◆ Industrial water treatment
- ◆ Paper industry
- ◆ Petrochemical industry
- ◆ Raw water pretreatment of thermal power plant
- ◆ Wastewater treatment
- ◆ flocculation, sludge dewatering, oil recovery and other application which suitable for PAM dosing system

Product introduction:

PAM dosing system is an automatic control system for the dissolving, diluting and dosing of flocculant PAM solid reagent. and the PAM solution prepared by stages processions in several separated tanks, ensure its best reaction time and concentration. The system is control by PLC, and when liquid level at low limit, the water supplement valve will be ON. Dosing unit start up by flow rate meter's signal and auto-adjust according to the flow rate to reach the accurate concentraion, and it'll stop when it reach the high limit, while the two or three agitators still working. The system is also suitable for the dilution of latex like polymer of cation, anion or non-ion, make them into 0.3~0.5g/L solution.

Parameter

Power of agitator: 1.1kw

Material of agitator: 304 or 316 stainless steel

Level control: magnetic or ultrasonic

Volume of tank: Can be set according to design chart

Control center: Siemens S7-200 series PLC

Interface: Siemens smart 700IE LCD touch screen

Dosing amount: 1000 ~ 10000L/H



Control panel and LCD touch screen view



Control cabinet internal view



Application case



Application case # 1

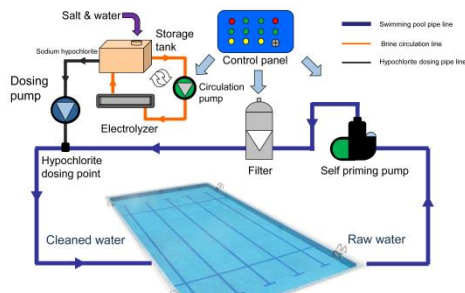


Application case # 1

Auto Filtering Disinfection System



Process diagram



Summary

It is a combination of filter and disinfection. Disinfection system is producing sodium hypochlorite solution by the electrolysis of salt water or sea water. Filtering pump, electrolysis system, dosing system are all controlled automatically.

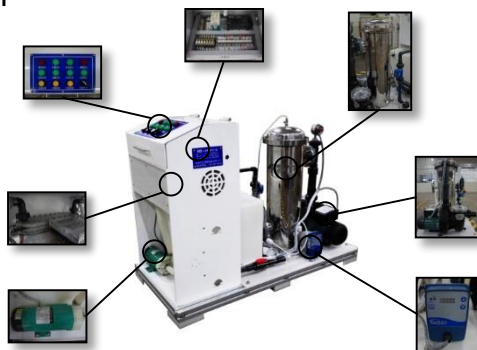
01 Circulation filtering system

02 Disinfection system

03 Auto/Manual control

04 Environmental friendly

05 Easy maintenance



Main components



Control panel:
indicating the running status of every function; the filter, electrolysis, dosage are all control auto/ manual here.



Inside circuit:
including power supply, PLC, relay, AC contactor etc. And the PLC is available for the connection with the light in the swimming pool, or other function.



Magnetic pump:
In charge of circulation of the solution from the tank to electrolyzer. 800~1200L/hour, 0.2 MPA



Electrolyzer:
Titanium(TA1) material, Chemnum 25 times special coating of ruthenium and iridium, auto polarity exchange design, ensure and high production and long life.



Bag filter:
SS316 shell, easy-clean filter-bag, an important part for the removal of impurity of water.



Circulation filter pump:
"AQUA" self priming pump, IP55 level, stainless steel, 1.5~7 CBM per hour, responsible for swimming pool water circulation and raw filtering function.



Dosing pump:
"SEKO" metering pump, IP65 level, 4~5L/hour, 0.35MPa, auto-control the accurate dosage of sodium hypochlorite.

Advantage for swimming pool application

All-in-one system

It combines of almost every components needed for a swimming pool, filter, disinfection, water circulation, when you receive that machine, just connect the pipeline, the electricity wire, input the salt and press the button, then it will take over all the job.

Low running cost

The only material for disinfection is salt, the system will electrolysis the 3% concentration salt water into 0.5% sodium hypochlorite, and dose into the swimming pool automatically. 300g salt is sufficient enough to treat 20~50 tons water.

Safer and easier operation

The machine take place in a closed loop system and running automatically, Pool technicians will no longer have to mix or hand dose chlorine again, only salt is needed to be pull into the dissolving tank, then after 60~100 minutes, you'll get 3500~4000ppm solution. Besides, the storage of chemicals will no longer be required in the stores or plant room making the whole place safer for both guests and employees.

Better quality water

With the System installed on your pools you will no longer see the water go cloudy during busy periods which happens with traditional dosing systems when they can not keep pace with the chlorine demand of the pool. The machine is sized to keep the pool water in perfect condition during the hottest and busiest periods. The slightly saline solution in the pool is similar to the natural salinity of our eyes. Contact lens solution is a similar salinity, hence most people find swimming in this environment far more pleasant than fresh water.

High Concentration Sodium Hypochlorite Generator (up to 12.5%)



Introduction:

High concentration sodium hypochlorite generator, is using membrane electrolysis 25% ~ 30% brine to produce chlorine gas, and sent into the reaction tower for mix reaction with sodium hydroxide, then got the final product of 12% sodium hypochlorite solution;
The system combine of: salt treatment unit, ultra-pure water system, control cabinet, electrolytic unit, reaction tower, sodium hydroxide recycled unit etc.;

The main reaction:

1 the diaphragm cell reactions

The power is $2\text{NaCl} + 2\text{H}_2\text{O} = \text{H}_2 + \text{Cl}_2 + 2\text{NaOH}$

Anode: $2\text{Cl}^- - 2\text{e}^- = \text{Cl}_2$

Cathode: $2\text{H}_2\text{O} + 2\text{e}^- = \text{H}_2 + 2\text{OH}^-$

2 The reaction tower:

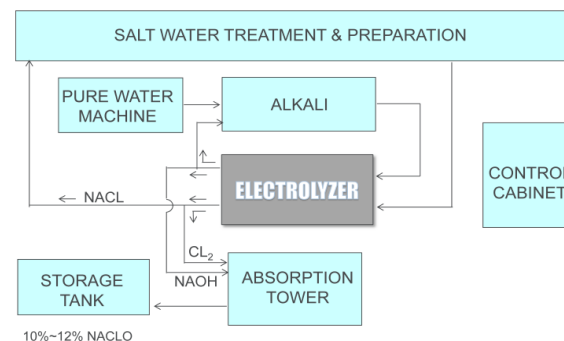
$\text{Cl}_2 + \text{NaOH} = \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$ (NaOH cooling liquid in case)

The High concentration sodium hypochlorite solution is a solution with high oxidation and strong sterilization ability, which widely applied for bleaching and disinfection.

Features & Advantages:

- ◆ Mature processing, stable performance
- ◆ Fully automatic operation, reducing the work and cost
- ◆ The components are all from famous domestic and foreign brand, ensure the stable running and long life
- ◆ The actual configuration can be adjusted according to customer demand and ensure cost-effective
- ◆ Excellent design, flexible capacity arrangement, easy installation

Process diagram



Main components



Control cabinet



Electrolytic unit



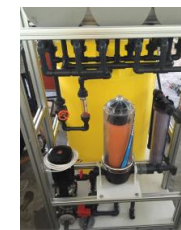
Reaction tower



Alkali tank + alkali recover system

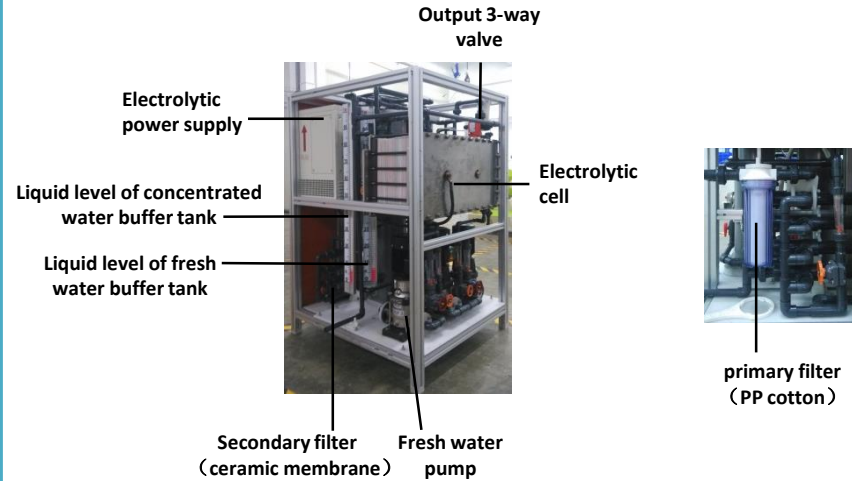


Ultra-pure water system



Multi-stages brine treatment system

Main components



Control cabinet & panel



Internal Diagram

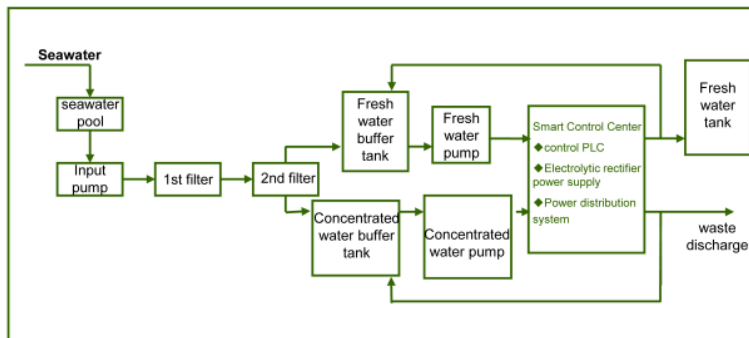


Electro-Power Control Box



Control Panel

Process diagram



Pipeline design



Raw Water Input



Fresh Water Output



Ceramic membrane filter discharge



Discharge of concentrated water