



MARINE, OFFSHORE ELECTRO CHLORINATION SYSTEMS
OCEANCHLOR



Contact Us

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On-site hypochlorite generation from seawater for
marine and offshore anti-fouling purpose.

Innovative Design and Solution of Offshore Chlorination



About Us

- Milestone Chlorination Technologies LLC. (MCT) is a growth company formed by group of experiences engineers and managers which specialized in the industry of chlorination, we provide specialized solutions in the chlorination field including electro chlorination, chlorine dioxide and membrane chlorination in application of anti-fouling and drinking water supply.
- MCT is a company based in China, specializing in Chlorination Titanium electrolyzer design, also electro chlorination for water treatment process design, consultant, engineering, development and manufacturing. Related services for chlorination electrolytic cell and electro chlorination system, such as electrolyzer & electro chlorination design, on-site inspection services, refurbishment, upgrade and replacement of electro chlorination cell for seawater and brine electrolysis are also parts of our specialty.



Technical Design Parameter

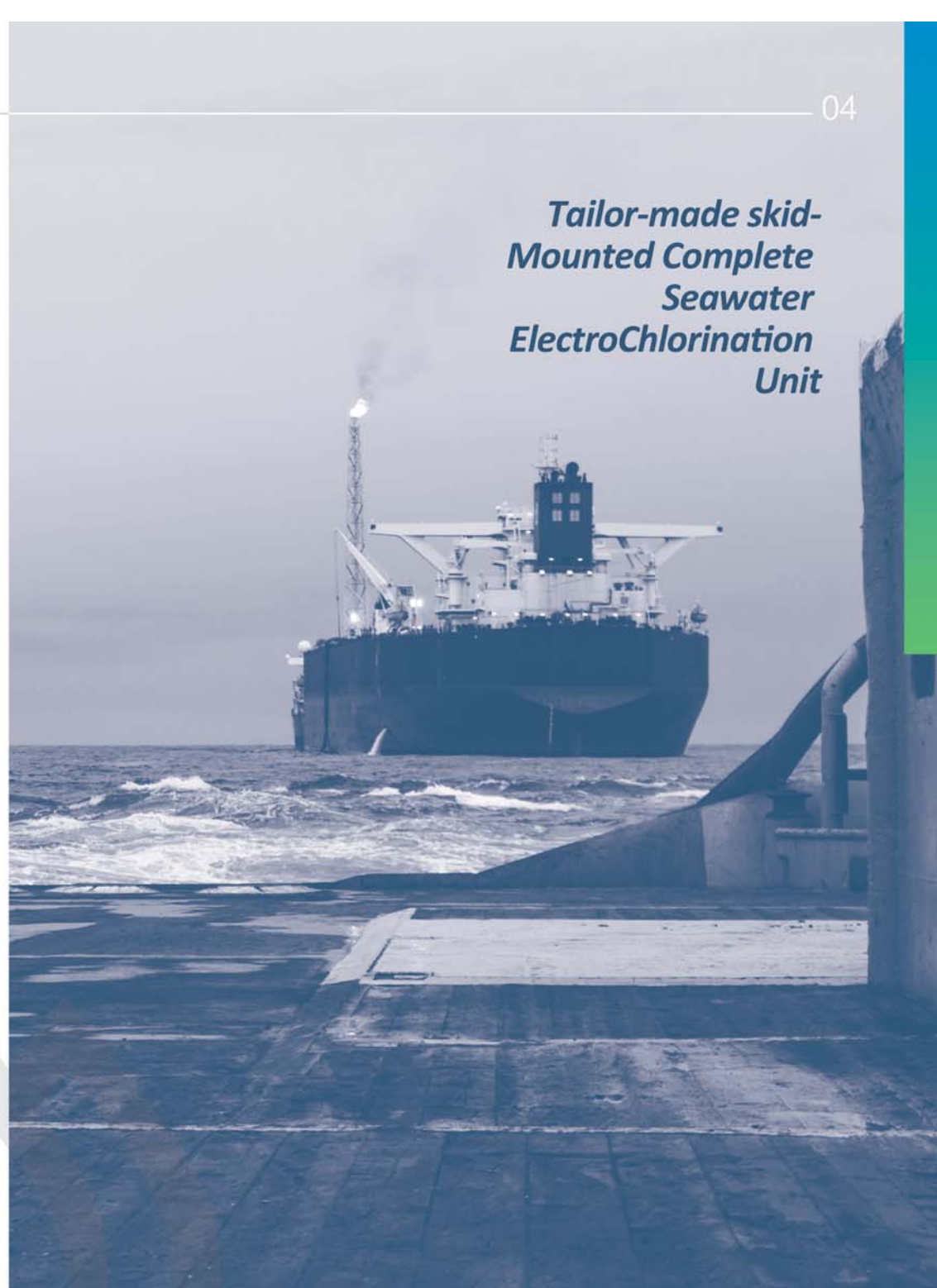
■ OceanChlor series Electro Chlorination Package is designed based on OceanChlor seawater electro chlorination for marine based industrial application that uses seawater for cooling has the potential for the formation of bio fouling from the various organisms lurking in the oceans.

The purpose of on-site generation sodium hypochlorite solution from seawater is to economically and safely produce this powerful biocide and disinfecting agent for industrial plant using.

Seawater based electro chlorinator is generally applied for protecting industrial cooling water, circulating water from bio growth, and being widely applied for the reason of its economic operating cost, as the raw material directly drained from the seawater and only electricity as well.

OceanChlor systems are the standard and preferred electro chlorination unit for bio fouling control particular in marine and offshore application.

Tailor-made skid-Mounted Complete Seawater ElectroChlorination Unit



Self-Cleaning Electrolyzer Technologies of Free Acid Cleaning

CTE (Concentric Tubular Electrodes) cell consists principally of titanium tubes and connected by plastic joint: inner cell Ti Tube, outer cell Ti Tube or some CTE electrolyzer requires inner cell bipolar and outer cell bipolar besides mentioned above with seawater flowing through the annular space between them. By passing an electric current through the seawater, the sodium chloride contained in the seawater shall be converted to sodium hypochlorite by the electrical chemistry reaction in the chamber.

The CTE Electrolyzer can only be applied in Seawater electrochlorination systems for Land based and marine application.

1. Self-Cleaning Technology for Continuous Operation without Acid Cleaning
2. Concentric Tube Electrolyzer (CTE) technology for offshore applications or on-shore systems where tubular cells are preferred by customer
3. Bi-polar design with seawater flow through annular region
4. High velocity turbulent flow regime for continuous operation achieving no acid cleaning.
5. Quick and easy maintenance of cell parts



(Platinum Concentric Tubular Electrolyzer)

Technical Design Parameter

Electrolyzer Type	Concentric Tubular Type
Parts & Fittings Material	ABS (or PVC) EPDM & Titanium
Anodes Tube Material	Titanium ASTM SB-338 2
Anodes Tube Coating	MMO, Ru & Ir or Pt. (According to seawater inlet temperature & chloride ion contents)
Cathodes Tube Material	Titanium ASTM SB-338 2
Cathodes Tube Coating	N/A
Bipolar Tube Material	Titanium ASTM SB-338 2
Bipolar Tube Coating	Half MMO, Ru & Ir or Pt. (According to seawater inlet temperature & chloride ion contents)
Seawater Inlet Flow rate	> 5 m ³ / Hr
Electrolyzer Design Temperature	55 Degree Celsius
Electrolyzer Design Pressure	8 to 10 Bar

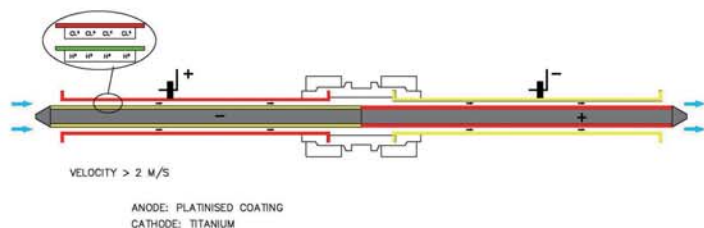
Process Description

Bio fouling control is one of the main challenges in the upstream processes of the power station is to protect pipeline and process equipment against biological fouling. Restriction of cooling water flows, acceleration of corrosion and a reduction in the overall life of process equipment can all be controlled by the effective design of our electro chlorination package. Seawater Electro chlorination system packages play an effective role in optimizing flow assurance. Raw seawater is fed into the package inlet at the designed flow rate via a side stream from the main seawater process line. The seawater is passed through strainer to remove large particles in the seawater, so that it will not cause electrodes coating damage or short circuit, and the filtrated seawater goes to the electrolyzer which has fed electrical supply from the package rectifier. Depending on pressure available this seawater flow will be pressure controlled or boosted to provide the optimum operating pressure and flow rate (required for the chosen electrolyzer configuration). The rectifier is designed specifically for the requirements of the installed electrolyzers. It converts the AC platform input voltage into the required low voltage DC current and regulates this output to a selected and controlled level. Electrolysis process takes place within the electrolyzer as per the following equation:

At the Anode: $2 \text{Cl}^- - 2 \text{e}^- \rightarrow \text{Cl}_2$

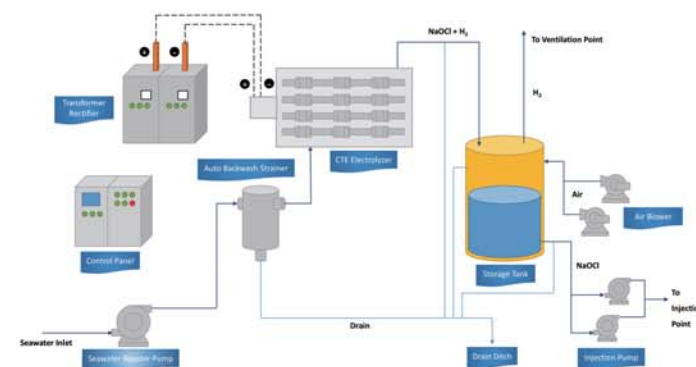
At the Cathode: $2 \text{Na}^+ + 2 \text{H}_2\text{O} + 2 \text{e}^- \rightarrow 2 \text{NaOH} + \text{H}_2$

Overall: $2 \text{NaCl} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOCl} + 2 \text{H}_2$



Application

- Through the electrolysis process the package produces the required amount of sodium hypochlorite together with the by-product, hydrogen gas. The solution with hydrogen gas are fed into degassing tank and the air blower blow the air into the tank to dilute, the diluted hydrogen gas vent to open atmosphere. The hydrogen free solution containing sodium hypochlorite is then dosed into the injection point through dosing pumps or gravity.



Typical OceanChlor Brine Electro Chlorination System

Typical OceanChlor Electro Chlorination System Component

- Seawater Booster Pump (Option)
- Seawater Backwash Strainer (Option)
- CTE Electrolyzer Assembly
- Rectifier
- Local Control Panel
- Degassing Tank
- Air Blower
- Injection Pump

Application

- *FPSO*
- *FLNG*
- *Marine*
- *Offshore Platform*

Technical Benefit & Features of Special Marine/Offshore Electrolyzer

- Milestone designed OceanChlor package electro chlorination system with new series of CTE (Concentric Tubular Electrodes) which can avoid acid washing and prevent potential hazardous situation might be caused by acid on shipboard.



Electrolyzer OEM

Working with the China major anode and specialty coating manufacturer, we have access to the leading industry electrolyzers with over 30 years' service.



Safety

Element chlorine is a dangerous chemical, it is harmful to human body like respiratory tract and retina or even death. On site generation with MCT electro chlorination system could prevent operator directly touches the chlorine or other strong acid and alkali for protection.



On site Production

Producing sodium hypochlorite on site reduces the requirement for using liquid chlorine solutions. The impracticality of shipping, storing and dosing large volumes of bulk hypochlorite for places have no access to sodium hypochlorite solution. Electro chlorination is the industry preferred method of bio-fouling control.



Process automation

Control of the complete technological process with a central PLC control system. Visualization of the entire process and logging of all key parameters of alarms. Any parts of the process of the system could also be adjusted by PLC.

