OPTIMUM ANODE TECHNOLOGIES™

OPTIChlor™ Marine Electrochlorination System for Bio-fouling Prevention

Optimum Anode Technologies is a reliable, quality supplier of dimensionally stable anodes with superior lead times. Optimum Anode Technologies is a business affiliate of Titan Metal Fabricators, a leading supplier of titanium and other exotic metal fabrication. Optimum Anode Technologies combines the excellent reputation and manufacturing know-how of Titan Metal Fabricators with our experience manufacturing dimensionally stable anode coatings. Our industry experts have more than 50 years of experience and expertise in anode technology, manufacturing and supplying cost-effective products that meet or exceed our customers' dimensionally stable anode needs.

Optimum Anode Technologies is an alternative supplier of marine concentric tubular electrolyzers for seawater electrochlorination. Optimum Anode Technologies builds and supplies the competitively priced OPTIChlor™ Marine (OCM) electrochlorination system for biofouling prevention and backs it with stellar service and support.

The OCM system generates sodium hypochlorite to prevent biofouling, or marine growth, in heat exchangers, sea water piping and related components. Electrochlorination is a reliable technology which has been used by the shipping industry for more than 40 years in thousands of applications. It has been shown to be more effective than other methods of marine biofouling prevention. Biofouling – whether from algae, bacteria, barnacles or such shellfish as mussels – reduces the efficiency of heat exchanger piping, corrodes the piping and eventually requires dry docking the ship for heat exchanger cleaning and repair – a costly process.

OPTIChlor Marine System Benefits

- Low maintenance, reduced maintenance costs
- Easy OCM system operation
- Self-cleaning with no acid-washing required
- Improved ship operation
- Competitively priced and reliable OCM
- Highly effective for prevention of biofouling and keeping cooling system internals clean; controls fouling organisms of all types and sizes
- Concentric tubular electrode cells are easy to replace when necessary, and can be wall-mounted or skid-mounted
- No chemicals necessary
- Environmentally responsible system based on seawater. No pollutants discharged.

OPTIChlor Marine System Features

- The OCM System uses titanium concentric tubular electrodes based on its T1M, T2M or T3 OPTIChlor electrochemical cell to produce sodium hypochlorite from the sea water.
- Continuous, adjustable, low-volume electrochlorination via OPTIChlor concentric tubular electrode cells
- Rugged design
- Built-in safety and shutdown

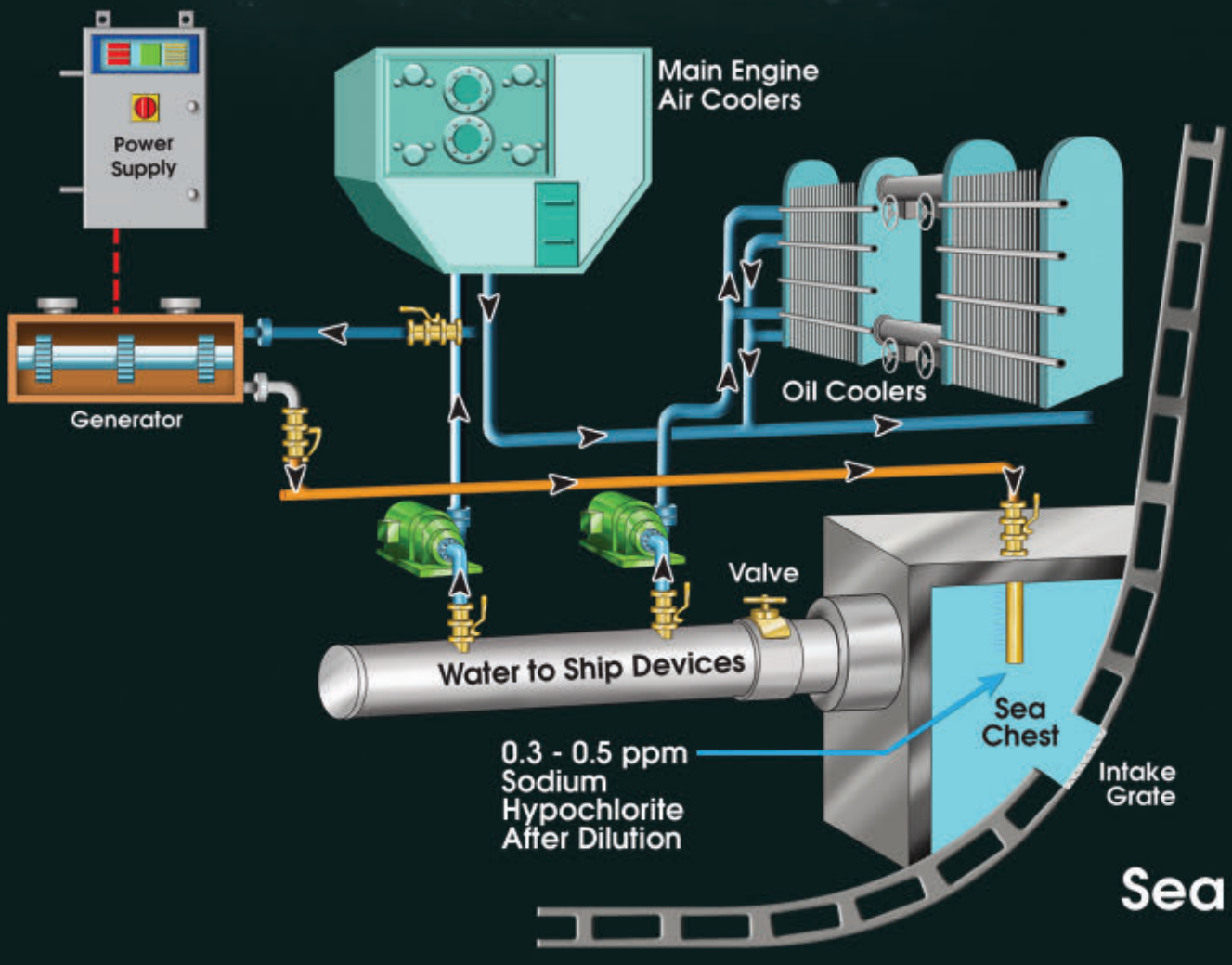
Here's How it Works

The heart of the process is the concentric tubular electrode electrochlorination generator. The sea water passes at high velocity (2 cubic meters per hour to 6.8 cubic meters per hour, or 9 gallons per minute to 30 gallons per minute) from a pressurized sea water line to the generator. Here, it passes quickly through the generating cell, which converts a portion of the salt water to sodium hypochlorite. The sodium hypochlorite flows to the sea chest where it mixes with incoming sea water to form cooling water for the heat exchanger. The 0.3 ppm to 0.5 ppm of sodium hypochlorite in the cooling water is just a trace amount, but it is enough to keep marine life from attaching to the piping, growing on the inside walls and plugging them. By preventing biofouling, the OCM electrochlorination system keeps all piping, equipment and sea water cycles, from intake to discharge, clear of marine growth for optimum operation.

Optimum Anode Technologies can also incorporate pumps and a biofouling control analyzer into the OCM system to automatically adjust sodium hypochlorite generation according to system flow rates and to prevent pollutant discharge.

The OPTIChlor Marine System can be scaled to suit a wide range of flow rates in most every kind of sea-going vessel or ship. These include: aircraft carriers, ocean cruise ships, tankers, roll on/ roll off ships, FSPO ships, fishing boats, tug boats, ferries – even offshore drilling platforms. Fulfilling an essential requirement for off-shore drilling platforms, Optimum Anode Technologies can build generators to meet the requirements of ATEX certification.

Typical OPTIChlor™ Hypochlorination System



Specifications of OCM model numbers.

Model	Nominal Rated kg/hr (lb/hr)	Input Power kVA	Output DC Volt	Output DC AMP	Concentration PPM	Min. Flow Req. m^3/hr (GPM)	S.W. Treated to 0.5 PPM m^3/hr (GPM)
OCM 0.05	0.05 (0.13)	0.7	15	25	25	2 (9)	100 (440)
OCM 0.1	0.1 (0.22)	1.4	15	45	50	2 (9)	220 (880)
OCM 0.2	0.2 (0.44)	2.6	15	90	100	2 (9)	400 (1750)
OCM 0.5	0.5 (1.1)	3.5	15	220	100	6.8 (30)	1000 (4400)
OCM 1	1 (2.2)	6.9	15	450	180	6.8 (30)	2000 (8800)
OCM 2	2 (4.4)	13.8	39	450	360	6.8 (30)	4000 (17600)
OCM 3	3 (6.6)	27	45	450	540	6.8 (30)	6000 (26400)
OCM 4	4 (8.8)	36	60	450	725	6.8 (30)	8000 (35200)
OCM 5	5 (11)	45	75	450	900	6.8 (30)	10000 (44000)
OCM 6	6 (13.2)	54	54	450	1090	6.8 (30)	12000 (52800)

In addition to providing new OPTIChlor™ Marine systems, Optimum Anode Technologies can replace existing Chloropac® Systems, or supply replacement cells and components as needed. In addition, Optimum Anode Technologies can customize and design configurations to meet customer output requirements.

Optimum Anode Technologies is committed to providing in a timely manner quality products and systems that meet or exceed our customers' technical and operational needs. At Optimum Anode Technologies, we continually apply our unique fact-finding and discovery consultative selling process to provide the most cost-effective solution, whether standard or custom-designed. Our quality, turnaround times and responsiveness to our customers' needs are unmatched.

OPTIMUM ANODE TECHNOLOGIES™

Optimum Anode Technologies, Inc.
352 Balboa Circle, Camarillo, CA 93012
Phone: 805-437-7435 • Fax: 805-484-5880
www.optimumanodes.com