



SECTION
5

'CUPRION' ANTI FOULING

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5.0 'Cuprion' Anti Fouling





CUPRION ANTI FOULING

REVISION 1

Cathodic Protection Co. Limited have manufactured and supplied the electrolytic 'Cuprion'TM anti-fouling system since the early 1970's to protect pumped sea water systems against marine growth. Today, the system is used by many of the major oil and gas offshore operators to protect vertical sea water and fire water pumps on platforms. Other applications include jetty fire pumps and sea water intake systems.



Benefits of the 'Cuprion'TM Ant-Fouling System Include:-

- Reduction in power requirements over alternative methods for fouling control.
- Low maintenance system
- Low power requirement
- No handling or storage of chemicals required
- Environmentally acceptable
- 35 years of proven experience



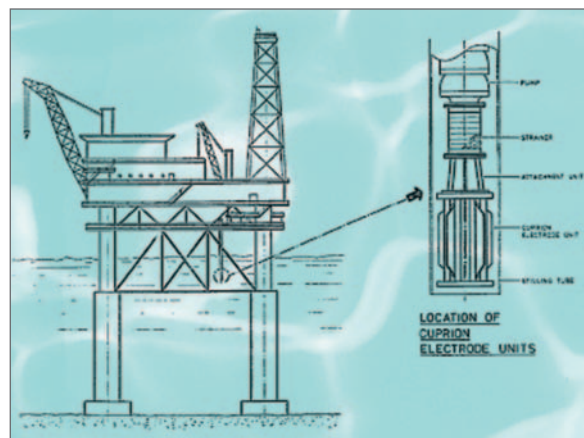
System Description

The method is based upon the use of impressed current on copper and aluminium anodes which are themselves contained within an insulated steel frame which forms the cathode. The anode/cathode electrode unit is suspended from the pump motor base within the confines of the caisson so that all the water entering the pump must pass the electrode unit.

The 'Cuprion' system consists of two parts – the electrode unit and control panel. The electrode contains a number of copper and aluminium anode bars held together in a steel frame to form the cathode. The actual number and size of the anodes is configured to suit each installation and available space for mounting the electrode unit. The anodes are connected to the constant current rectifier located within a safe area.

The control panel is designed to regulate the anode currents in both 'pump on' and 'pump off' condition, so that during the pump standby condition an atmosphere of copper ions in the local environment will maintain the pump free from fouling. This feature is particularly useful for installation on fire pumps that are generally operated for a short period each week.

Dosage levels of copper ions are extremely small and measured in micrograms per litre of seawater. Therefore, relatively small quantities of copper are required to provide protection dependent upon the flow rate and life required.





CUPRION ANTI FOULING

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Application For Submerged Pumps

With extensive experience in the design of 'Cuprion'™ systems, CPCL provides anti fouling equipment for a wide variety of applications including :-

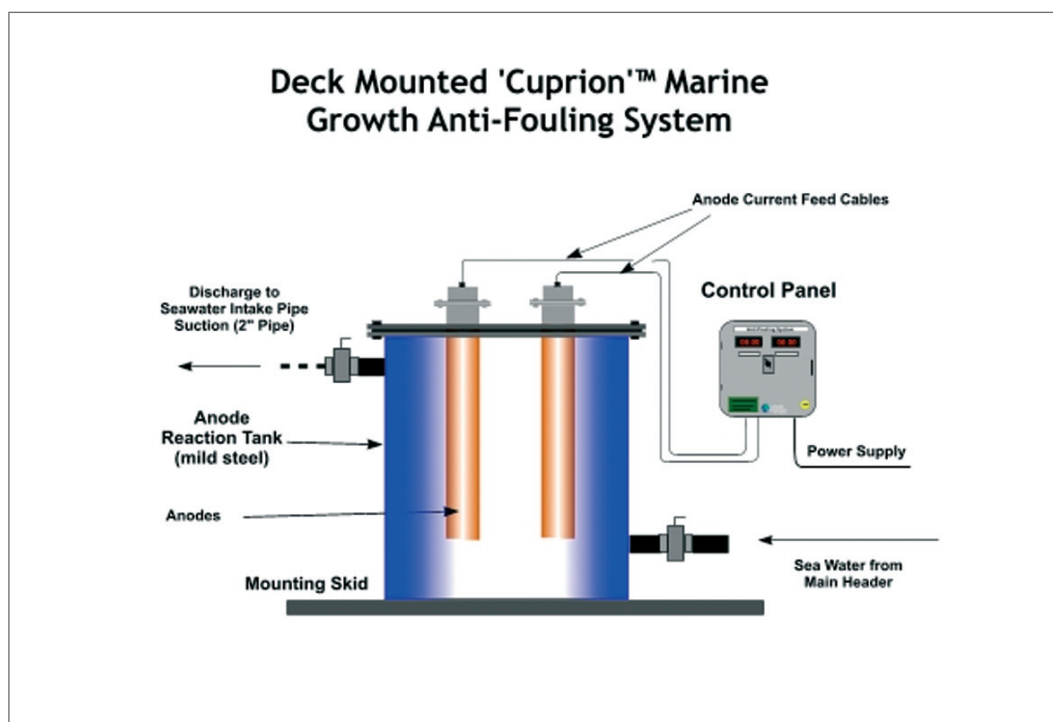
- Offshore sea water lift pumps
- Offshore fire water lift pumps
- Jockey Pumps
- Jetty Fire Pumps
- Industrial sea water cooling systems



Deck Mounted Option

For some applications traditional method of pump / electrode configuration may not be suitable. As an alternative we offer the deck mounted system.

With the deck mounted 'Cuprion'™ anti-fouling system the anodes are located inside an tank through which sea water is fed from the main sea water system. As the water passes through the tank the carefully controlled anode currents ensure that the correct dosing level is applied for the particular application. The treated water is then piped down directly to the pump suction. In this way several pumps can be protected against fouling from a single treatment source. The Deck Mounted 'Cuprion'™ System is ideally suited for retro-fitting where the pump / electrode configuration may not be possible.





Marine Growth Anti-Fouling Systems

Cuprion™

SHIPS & MARINE VESSELS

REVISION 1

Bio-Fouling of seawater intakes on Ships & Marine Vessels can be a major problem, causing expensive equipment damage and pipework blockages, leading to shut down of vital seawater supplies.



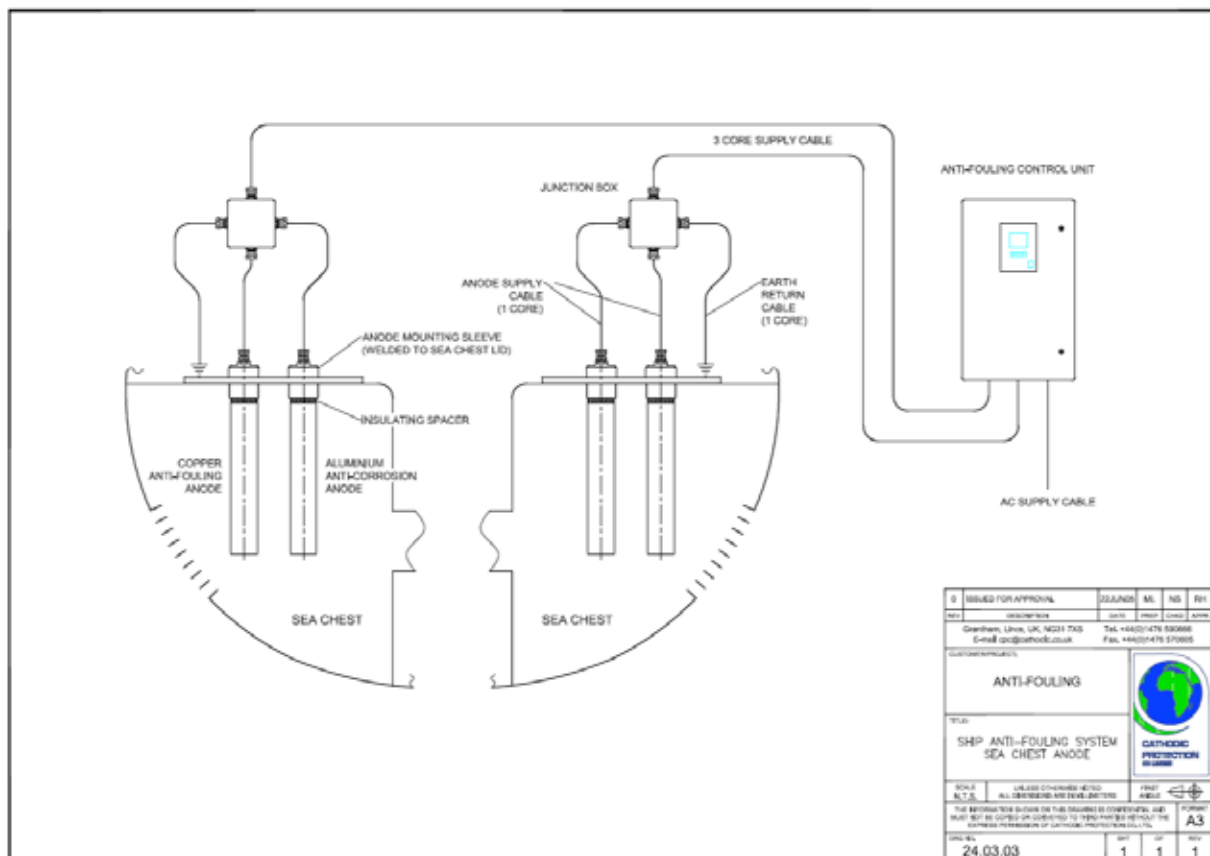
In the case of FW and FI FI systems Crew Safety and Activity Reliability must be considered. In addition, repairs to damaged pumps, valves and pipe work are both costly and time consuming.

Chief Engineers would consider any remedial actions involving pipe section removal, repair, cleaning and re-installation as major refurbishment work on any operating marine craft or vessel.

Cuprion™ - THE SOLUTION

Cathodic Protection Co. Limited has developed a range Cuprion™ anti-fouling systems to protect submerged pumps, seawater intakes and associated pipework against marine growth. Originally the Cuprion™ system was developed and utilised for application on Platforms in North Sea during the Early 1970's.

Developing the system for use on Ships and Marine Vessels involved changes to hardware and installation methods, Design requirements remained unchanged as Cuprion™ operates on proven electrolytic principles,





Marine Growth Anti-Fouling Systems

Cuprion™

FIREWATER PUMP FOULING PREVENTION

REVISION 1

Marine Growth Prevention is achieved by employing a small dc current flow (generally less than 0.5 Kw). This current flow energises copper and aluminium anodes to produce a fully effective, anti-foulant dosing solution. Selected dosing levels vary slightly to suit location and application, however maximum dosing limits utilised for design purposes are 25 µg/litre and 4 µg/litre for copper and aluminium respectively.

Copper is a natural biocide / algaecide and provides complete protection from marine growth with no adverse environmental impact.

Aluminium anodes produce aluminium hydroxide, which combines with the copper ions holding them in solution, keeping pipe work blockage free. Aluminium hydroxide also helps to arrest corrosion on internal pipe surfaces.



Where space or weight restrictions are design considerations, CPCL have developed systems that can be mounted above or below deck. These systems utilise an electrolysis tank or Dosing Spool.

The Cuprion™ anodes are simply mounted in the electrolysis tank or Candu™ dosing spool and energised to produce anti-foulant solution, which is delivered via suitably rated pipes or hoses. Several seawater intake systems can be Marine Growth Protected from a single source,



Electrolysis tanks are generally mounted on a steel plinth along with the dc power unit, making the complete system integral, ideal for maintenance operations.

The Candu™ dosing unit can be mounted vertically or horizontally in any accessible, convenient location.

Electrodes take around 30 minutes to replace whilst at sea or in a dry dock, on these easy to maintain and flexible Anti-Fouling systems.

Cuprion™ - IN THE MARINE INDUSTRY

Cuprion™ systems have been installed on all types of Ships & Marine Vessels indicative list below.

Vessel Details	Country	Client	Details
FPSO Support Vessels	UAE	Lamnalco	Engine Cooling and Fire Fighting Systems.
Curlew AHTS	UAE	Lamnalco	Engine Cooling and Fire Fighting Systems.
60 Metre AHTS	Thailand	Mermaid Maritime	Central Cooling System
40 Metre Ferry Boat	Croatia	Divcom d.o.o	Electrodes mounted in Fwd & Aft Sea Chests.



Marine Growth Anti-Fouling Systems

Cuprion™

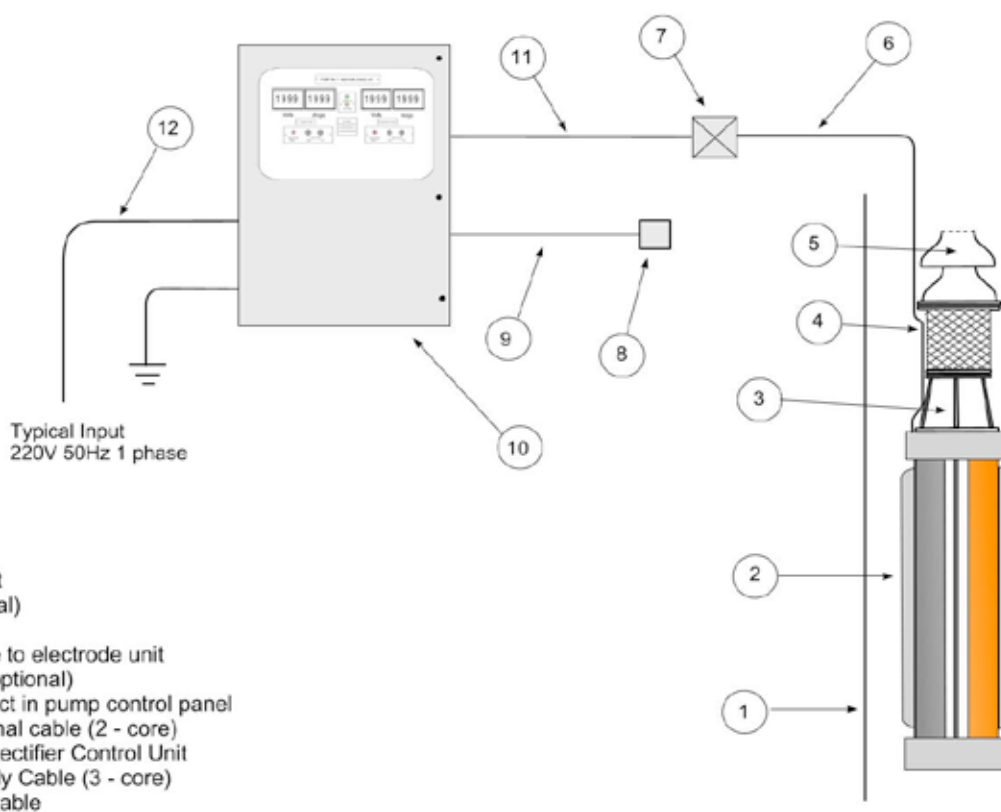
FIREWATER PUMP FOULING PREVENTION

REVISION 1

NFPA 20 - Cuprion™ STANDARD RANGE

CPCL have developed a standard range to suit National Fire Protection Association directives in NFPA 20 – Standard for the Installation of Stationary Pumps for Fire Protection. The selector chart overleaf indicates the range of Cuprion™ systems available to suit NFPA 20.

NFPA 20 - Cuprion™ SCOPE OF SUPPLY



NOTES.

Items 2, 3, 6, 7, 8 & 10 provided by CPCL, remainder by others. CPCL can provide Items 4, 9, 11 & 12 upon request and receipt of relevant information.

Standard TR Control Unit utilises M/Steel coated IP45 enclosure suitable for indoor installation, other specifications available upon request.

Electrode Unit cable tail employs multi-stranded, tinned copper conductor, CSA to suit current output.

System available in 12-14 weeks (Ex-Works) from Approved Documents/Purchase Order depending on client requirements,



Marine Growth Anti-Fouling Systems

Cuprion™

FIREWATER PUMP FOULING PREVENTION

REVISION 1

NFPA 20 - Cuprion™ SYSTEM SELECTOR

Flow Rate		Electrode Life (Years)	Electrode Weight (kgs)	Cuprion™ System I.D. Code
Usgpm	L/min			
25	95	10	45	NFPA - 0025 - 10
50	189	10	45	NFPA - 0050 - 10
100	379	10	45	NFPA - 0100 - 10
150	568	5	45	NFPA - 0150 - 05
200	757	5	45	NFPA - 0200 - 05
250	946	5	45	NFPA - 0250 - 05
300	1,136	5	45	NFPA - 0300 - 05
400	1,514	5	60	NFPA - 0400 - 05
450	1,703	5	60	NFPA - 0450 - 05
500	1,892	5	60	NFPA - 0500 - 05
750	2,839	5	80	NFPA - 0750 - 05
1,000	3,785	5	90	NFPA - 1000 - 05
1,250	4,731	5	110	NFPA - 1250 - 05
1,500	5,677	5	145	NFPA - 1500 - 05
2,000	7,570	5	145	NFPA - 2000 - 05
2,500	9,462	5	170	NFPA - 2500 - 05
3,000	11,355	5	200	NFPA - 3000 - 05
3,500	13,247	5	245	NFPA - 3500 - 05
4,000	15,140	5	260	NFPA - 4000 - 05
4,500	17,032	5	310	NFPA - 4500 - 05
5,000	18,925	5	390	NFPA - 5000 - 05

Electrode unit weight may vary, sizing based on maximum practical weight, shorter electrode life can be accommodated to suit project specific requirements.

CPCL shall provide a formal quotation for a standard NFPA 20 Cuprion™ within 2 working days from receipt of a formal enquiry, email sales@cathodic.co.uk. For further visit our website at www.cathodic.co.uk.





Marine Growth Anti-Fouling Systems

Cuprion™

OFFSHORE PLATFORMS

REVISION 1

Bio-Fouling of water intake pumps and pipework on Offshore Platforms can be a major problem, causing expensive equipment damage and pipework blockages, leading to shut down of vital seawater supplies.



In the case of fire water systems Crewe Safety and Structure Integrity must be considered. In addition, repairs to damaged pumps and pipe work are both costly and time consuming.

Maintenance Managers would consider any remedial actions involving pipe section removal, repair, cleaning and re-installation as major refurbishment work on any operating offshore facility.

Cuprion™ - THE SOLUTION

Cathodic Protection Co. Limited has developed a range Cuprion™ anti-fouling systems to protect submerged pumps, seawater intakes and associated pipework against marine growth. Originally the Cuprion™ system was developed and utilised for North Sea application during the Early 1970's. Today the system is specified for use on Offshore Platforms worldwide by many of the major Oil & Gas offshore operators.

Cuprion™ operates on electrolytic principles, employing a small dc current flow (generally less than 1 Kw). This current flow energises copper and aluminium anodes to produce a fully effective, anti-foulant dosing solution. Selected dosing levels vary slightly to suit location and application, however maximum dosing limits utilised for design purposes are 25 µg/litre and 4 µg/litre for copper and aluminium respectively.

Copper is a natural biocide /algacide and provides complete protection from marine growth with no adverse environmental impact.

Aluminium anodes produce aluminium hydroxide, which combines with the copper ions holding them in solution, keeping pipe work blockage free. Aluminium hydroxide also helps to arrests corrosion on internal pipe surfaces.



The Cuprion™ system has been successfully applied on all types of seawater intakes from submerged pumps to open intake sea chests. The design of the electrode units can be adapted to suit all application requirements, but are usually flange mounted on submerged pumps or bolted to the wall of a sea chest.



Where space or weight restrictions are design considerations, CPCL have developed a deck mounted system that utilises an electrolysis tank with required seawater flow and return connections.

The Cuprion™ anodes are simply mounted in the tank and energised to produce anti-foulant solution, which is delivered to the intake area via suitably rated pipes or hoses.



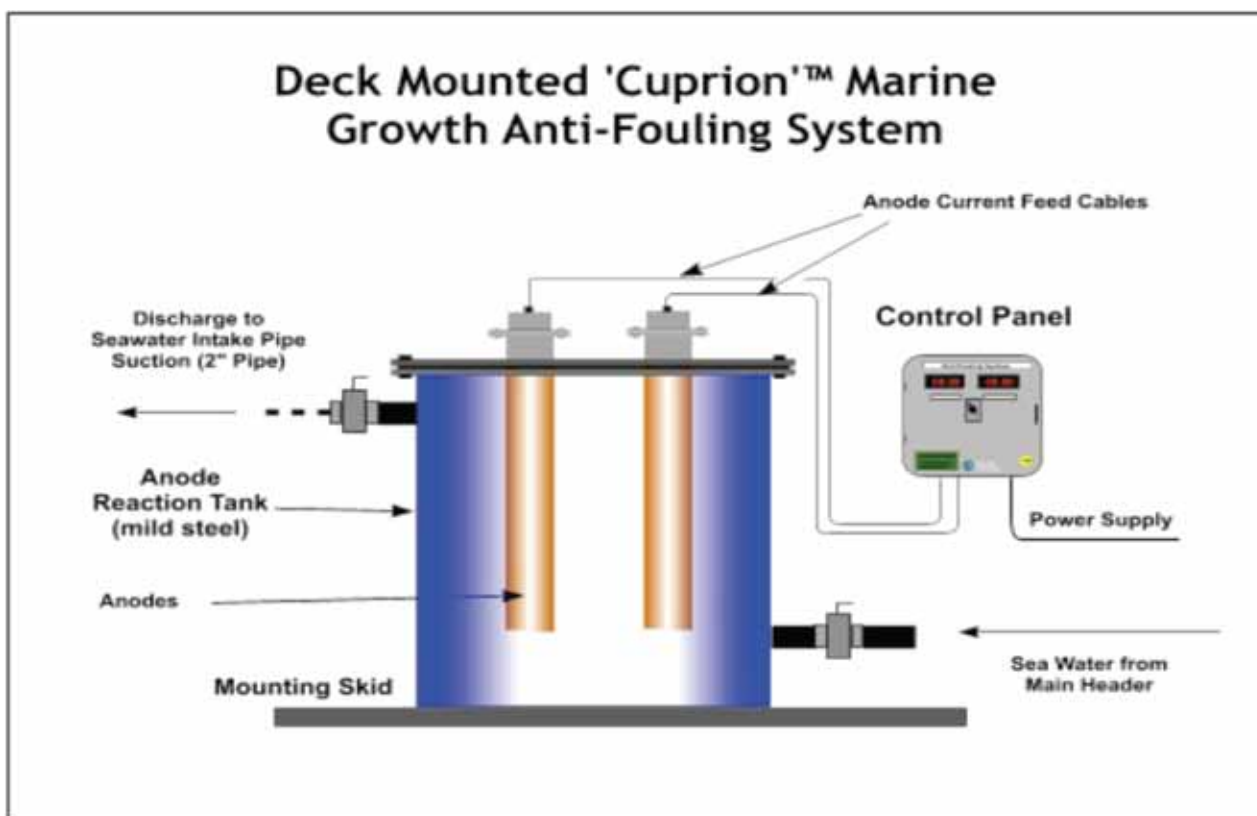
Marine Growth Anti-Fouling Systems

Cuprion™

OFFSHORE PLATFORMS

REVISION 1

The electrolysis tank is generally mounted on a steel plinth adjacent to the dc power unit, making the complete system integral, ideal for maintenance operations. Anti-Fouling electrodes take around 30 minutes to replace.



Cuprion™ - IN THE OFFSHORE INDUSTRY

Cuprion™ systems have been installed on all types of offshore structures worldwide, indicative list below.

Field/Platform	Country	Client	System Details
Angostura Gas Project	Trinidad	BHP Billiton	Firewater & Jockey Pumps. Deck Mounted System.
Cleeton	UK	BP Exploration	Fire & Sea Water Pumps. Pump Mounted Electrodes.
Lyell Field Power Buoy.	UK	Monitor Oil	Cooling Water Intakes. Sea Chest Mounted Electrodes.
Orlan, Sakhalin Island	Russia	Exxon Mobil	Fire/Seawater Lift Pumps, Pump Mounted Electrodes.
Panna Capacity Enhancement	India	WPIL	Seawater Lift Pump, Pump Mounted Electrode.
Rough Platform Upgrade	UK	Amec/Centrica	Change from ECU to Cuprion™. Cooling, Fire & Service Water. Pump Mounted Electrodes.

To obtain additional technical or product data sheets on our Anti-Fouling products please contact us on email sales@cathodic.co.uk. For further information on CPCL visit our website at www.cathodic.co.uk.