



**ICCP Hull Corrosion Protection  
Seawater Pipework Anti-fouling**

**Cathelco** 



# Protection against marine growth in pipework

Blockages in seawater pipework systems can be time consuming and expensive to remove. With an exceptionally wide range of control panels and anodes, the Cathelco system gives complete and continuous protection to yachts of any size.

The investment in the system is rapidly recovered through savings in maintenance costs. Beyond this, there is the reassurance that your yacht is reliably protected, now and into the future.

As world leaders in electrolytic anti-fouling systems, Cathelco can provide expert advice concerning your specific installation and you are supported through an international network of agent/installers.



## Nano System

The Nano system is the latest step in miniaturisation, enabling the control panel and anodes to be easily and economically fitted in areas where space is limited.

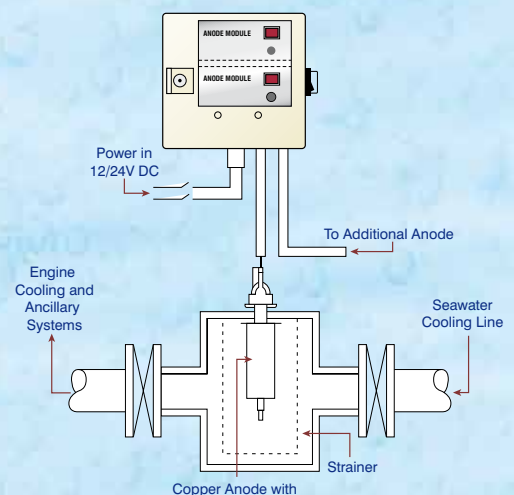
Systems are custom-made for their applications to provide anti-fouling only or a combination of anti-fouling and corrosion suppression. A variety of anode types are available to fit within the smallest strainers, including anodes with integral cathodes for plastic strainers.

Easy to install and economically priced, the Nano System brings peace of mind to owners of luxury yachts from just 20ft upwards.

- Ultra compact system to protect against bio-fouling in seawater pipework.
- Suppresses corrosion in pipework (in dual purpose systems).
- Requires minimum attention from crew.
- Can be powered from yacht's battery supply – 12V to 24V d.c.
- Copper anodes used to protect steel, stainless steel or copper alloy strainers and pipework against bio-fouling.
- Copper anodes with integral cathodes to protect plastic strainers and pipework.



Anode with integral cathode in Vetus strainer.



### Photographs

Maltese Falcon - Amory Ross/superyachtart.com  
 Lulworth Windrose - Colin Squire  
 Ecstasea - Marco Van Belleghem/superyachtart.com  
 Hull Corrosion - Capt R. Le Quesne  
 Limitless - Marco Van Belleghem/superyachtart.com  
 Mia Elise - Jim Raycroft/superyachtart.com

# Micro & Mini Systems

The Micro system eliminates blockages in seawater engine cooling systems caused by barnacles and mussels and has been designed for larger luxury yachts with a number of seawater inlets.

The system is based on the electrolytic principle and creates copper ions giving a dosage of just 2 parts per billion which prevent barnacles and mussels from settling and growing in seawater lines. Its effectiveness has been proved on some of the largest luxury yachts in the world over a period of more than 30 years.

Systems can be supplied solely for anti-fouling or as dual purpose units combining anti-fouling and corrosion suppression features.

- Prevents pipework bio-fouling by barnacles and mussels.
- Suppresses corrosion in pipework (in dual purpose systems).
- Requires minimum attention from crew.
- Easy and economical to install at newbuilding or retrofit.
- Can be powered from the yacht's battery supply (12V to 24V d.c.) or 220V/110V single phase.
- Copper anodes - used to protect pipework against bio-fouling.
- Aluminium anodes - provide corrosion suppression in steel pipework.
- Ferrous anodes - provide corrosion suppression in cupro-nickel pipework.
- Nylon mounting sleeves to fit easily into steel or plastic strainer lids.



Pico anode (3355)

Nano anode with an integral cathode (2525)

Nano anode (2755)



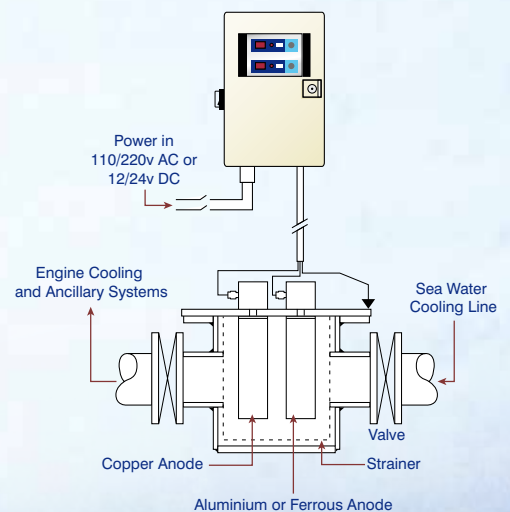
Anode with plastic sleeve



Anode with steel sleeve



Dual purpose anode



# Hull corrosion protection



Cathelco provide reliable and technologically advanced solutions to problems of hull corrosion using impressed current cathodic protection (ICCP) systems.



With lightweight, flush mounted anodes, the systems achieve optimum efficiency without detracting from the smooth lines of the craft – minimising drag and safeguarding the overall appearance.

The Minitek system has been specifically designed to protect steel hulls, whilst Alutek incorporates special controlling and monitoring electrodes to provide precisely controlled corrosion protection for aluminium hulls at an economical cost.

## Minitek – for steel hulls

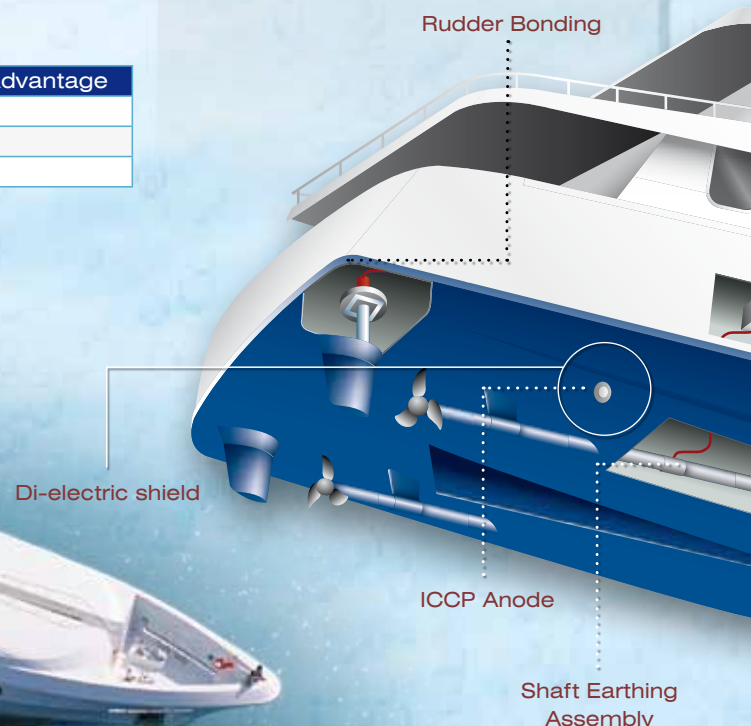
The Minitek system uses the latest technology to protect steel hulled yachts against corrosion. This is achieved by a compact control panel and an arrangement of anodes and reference cells which are flush mounted on the hull – so there is nothing to interrupt the smooth profile or cause additional drag.

The current to the anodes is constantly monitored and adjusted to provide the 'optimum' level of protection at all times. This is far superior to the performance of sacrificial anodes where the amount of protection cannot be easily verified and may be insufficient to prevent corrosion.

- Anode life 15 years – unlike sacrificial anodes.
- Reduced weight in comparison with sacrificial anodes.
- Flush mounted anodes to ensure smooth hull profile.
- No maintenance required.
- Self diagnostic system.
- Operates from 230V a.c. electrical supply.
- Control panel measures only 600mm x 600mm x 210mm.



Length approx	Sacrificial Anodes	ICCP System	Weight Advantage
25m	186 kg	40.5 kg	145.5 kg
45m	465 kg	52 kg	413 kg
60m	926 kg	85 kg	841 kg



# Alutek – for aluminium hulls

Aluminium is generally regarded as a stable material which does not corrode easily. However, when used in conjunction with other metals such as bronze propellers and steel components, serious problems of hull corrosion can arise.

The Alutek system uses the latest technology to eliminate corrosion on aluminium hulls. Unlike traditional sacrificial anode systems, it utilises flush mounted, lightweight anodes and advanced monitoring systems to provide the optimum level of protection.

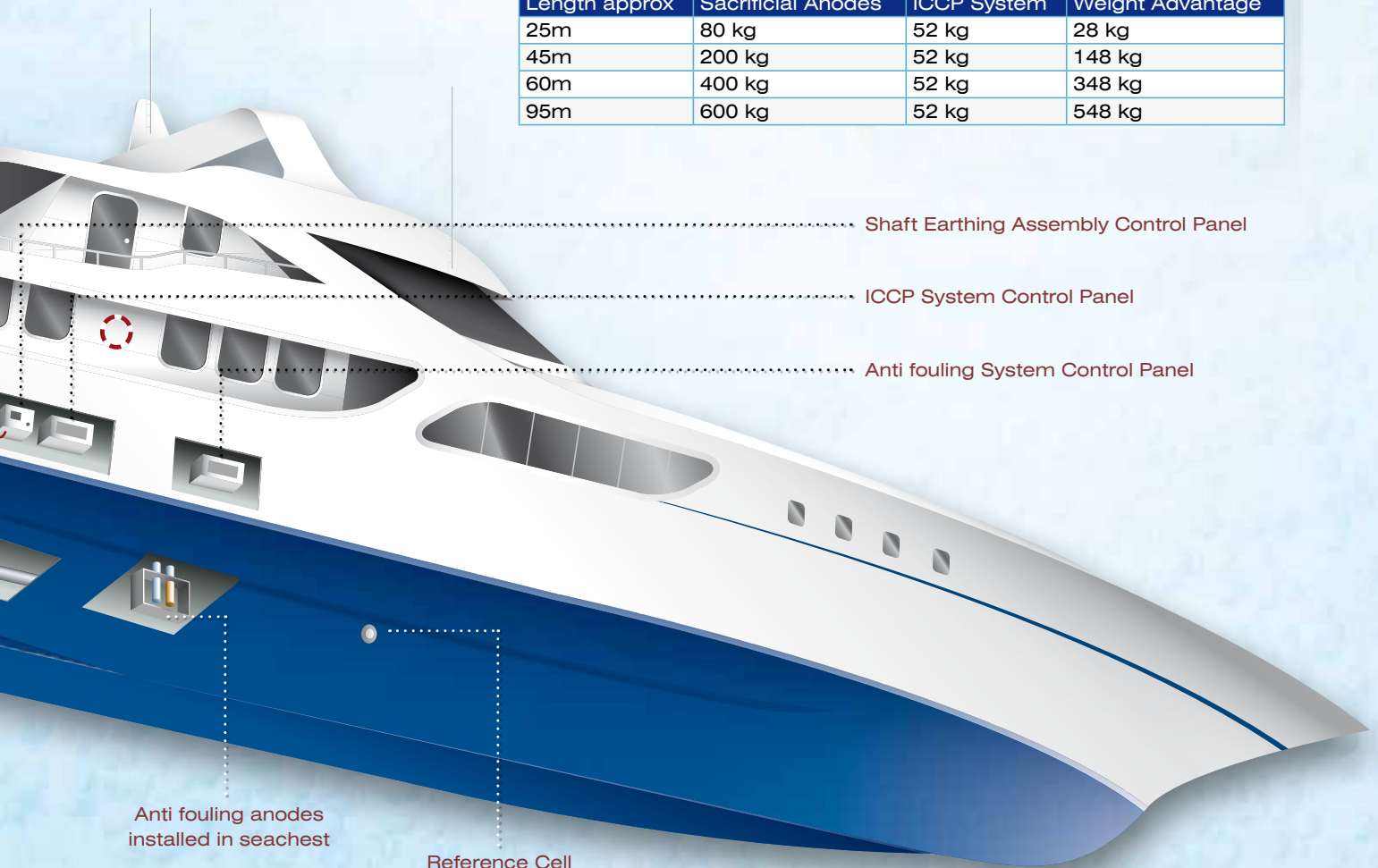
So there is nothing to detract from the smooth lines of your yacht or reduce its speed.

- Flush mounted anodes keep the hull streamlined.
- Reduced weight in comparison with sacrificial anodes.
- Automatic system – constantly monitors and adjusts output.

- Operates from 230V or 115V a.c. electrical supply.
- Monitoring electrodes – measure the electrical potential near the dielectric shield.
- Controlling electrodes – measure the electrical potential at a remote point on the hull.
- Shield sensors – detect changes in resistance at the coated aluminium/ seawater interface.
- Lower yard installation costs than recessed sacrificial anodes.



Length approx	Sacrificial Anodes	ICCP System	Weight Advantage
25m	80 kg	52 kg	28 kg
45m	200 kg	52 kg	148 kg
60m	400 kg	52 kg	348 kg
95m	600 kg	52 kg	548 kg



Shaft Earthing Assembly Control Panel

ICCP System Control Panel

Anti fouling System Control Panel

Anti fouling anodes installed in seachest

Reference Cell

# Portable Corrosion Monitoring System



How can you be sure that your vessel's cathodic protection system is working properly? Whether you have a sacrificial anode or an impressed current system it is important to know whether it is functioning effectively to prevent hull corrosion.

The Cathelco Portable Corrosion Monitoring System is an essential piece of equipment for ship's crew. It provides a means of testing the electrical activity in seawater surrounding the hull (which causes corrosion) and a way of measuring it against a recommended standard. Inadvertent connections to an un-isolated shore grounding can be easily detected, enabling action to be taken to avoid bi-metallic (galvanic) corrosion.

Readings can be made when a vessel returns to port to ensure that there is no drain on the cathodic protection system from other vessels or via jetties and piers as the result of a grounding fault from the AC shore supply.

Using the system regularly avoids the risk of unknown corrosion activity and the costs associated with unplanned haul-out. The kit consists of the following items:

## Calibrated Silver/ Silver Chloride Portable Reference Electrode

When taking readings, this is suspended over the side of the vessel to monitor electrical activity in the seawater. It is supplied with a 30 metre cable.

## Calibrated Digital Volt Meter

When connected to the Portable Reference Electrode, readings can be taken and compared with an 'ideal protection value' to see if any remedial action is necessary.

## Instruction Manual and Procedures

A complete guide to using the system with advice on interpreting readings and identifying corrosion problems.

## Carrying Case

A rugged, but lightweight and compact case for storing the equipment safely.

## Free Log Sheet Analysis

Log sheets can be sent to Cathelco for expert analysis to ensure that cathodic protection systems are functioning effectively.



# Galvanic Isolators



Galvanic isolators are used to ensure that there is separation between the grounding of a shore power supply and the yacht's electrical grounding. This provides the following benefits:-

- Eliminates corrosion problems caused by the difference between the potential of the yacht and the shore ground.
- Corrosion currents cannot travel between yachts which are tied to the same shore ground.
- Prevents the risk of corrosion in key components of the propulsion system. Even relatively small levels of corrosion can seriously damage important propulsion components.
- Does not remove safety factor provided by grounding in the event of electric shock.

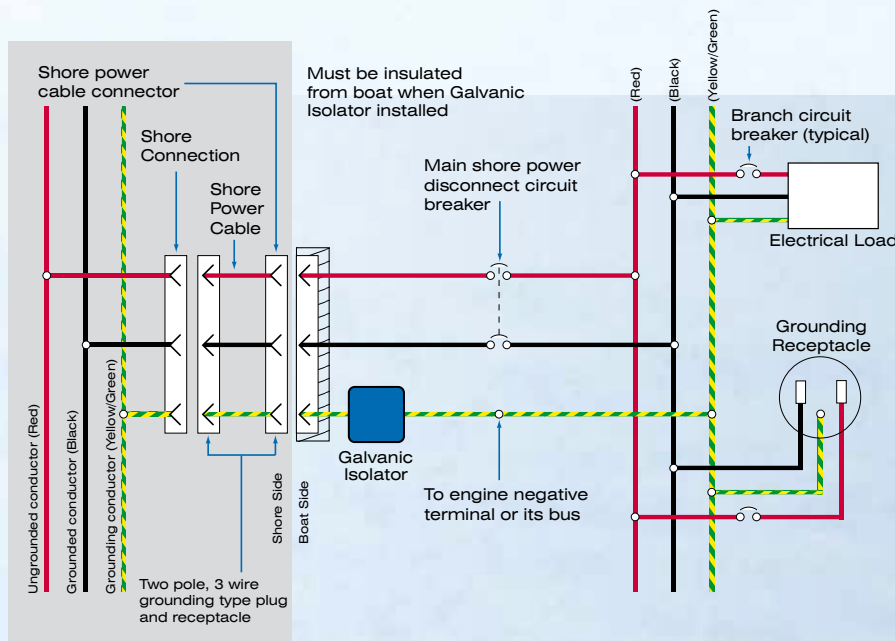
Whenever a yacht is connected to AC shore power, a bimetallic circuit can be created causing corrosion of the vessel and its drive system components.

In Europe most ports provide an isolated power supply for vessels, but in the USA it is mandatory for the shore power supply to be grounded.

Cathelco galvanic isolators are rated for harsh electrical conditions with high ratings for AC fault current, lightning surge current, and steady-state AC current. Key to the design is the fail-safe nature of the product. If current values in excess of the rating are experienced, the product is assured to fail in the shorted mode, providing safety grounding under all conditions.

The isolators have the following features:-

- Rated for 100A AC continuous.
- Highest AC fault current ratings available.
- Ignition protected.
- Maintenance-free solid state design.
- Rated for high levels of lightning current.
- Very low DC leakage current allowed.
- Exceeds requirements of ABYC standard A-28
- No monitoring system required.





# MEGAYACHT PROFESSIONAL



Jotun Paints leading edge technology demonstrates the way forward in vessel protection through the development of the world's best antifoulings and in a range of all-round-the vessel products that protect more than 15,000 ships worldwide.

This success is mirrored in the Megayacht Professional range of enamels, antifoulings, primers and undercoats, fillers and sealers - products that bring Jotun Paints unrivalled, globally proven standards of lasting, quality protection and beauty to an ever increasing portfolio of the world's finest megayachts.



### Corrosion consultancy for yachts

Cathelco have wide experience of investigating corrosion problems on luxury yachts around the world. Surveys can focus on any of the following areas:-

- Pipework systems
- Hull corrosion – steel and aluminium
- Corrosion related to exhaust systems
- Corrosion related to paint coating flaws

Using their expertise, Cathelco's corrosion engineers will seek to establish the cause of the problem by looking at material selection and a variety of other factors which may have contributed to corrosion. Where appropriate they will recommend viable solutions which may involve provision of additional anodes or other types of remedial action.

### Corrosion management courses



Cathelco 1 Day Corrosion Management Courses have proved highly successful with hundreds of delegates and won critical acclaim from the yachting press.

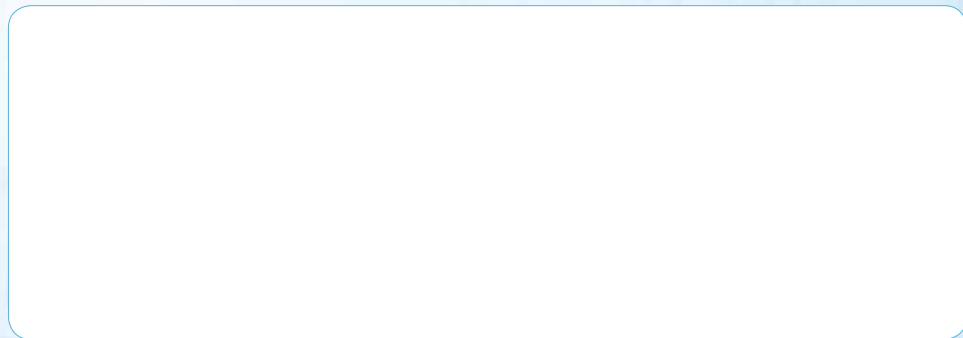
If you are a yacht captain or crew member, you will achieve a clearer understanding of how hull corrosion occurs and the best way of preventing it. This is equally important for yacht designers and build superintendents.

Courses are held at yachting centres throughout Europe and the Mediterranean. For further information telephone +44 1246 246700 or email [training@cathelco.com](mailto:training@cathelco.com)

### References

Cathelco systems protect more than 300 luxury yachts and have been installed by the following yards:

- |   |                         |                  |
|---|-------------------------|------------------|
| ■ Abeking & Rasmussen                       | ■ Christensen Shipyards | ■ Oceanfast      |
| ■ Alloy Yachts                              | ■ Delta Marine          | ■ Oceanco        |
| ■ Alstom Marine (Chantiers de l'Atlantique) | ■ Devonport Yachts      | ■ Overmarine     |
| ■ Amels Holland                             | ■ De Vries              | ■ Pendennis      |
| ■ Astilleros Tarrob .                       | ■ Hakvoort              | ■ Perini         |
| ■ Azimut                                    | ■ HDW                   | ■ Proteksan      |
| ■ Barcos Deportivos                         | ■ Holland Jachtbouw     | ■ Royal Van Lent |
| ■ Benetti                                   | ■ Navantia              | ■ Sunseeker      |
| ■ Blohm & Voss                              | ■ Kingship Marine       | ■ Trinity Yachts |
|   | ■ Lurssen Yachts        | ■ Vitters        |



Payment can be made using most major credit cards:



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