

Introducing a new generation of high performance ICCP anodes

Cathelco C-MAX

- Small footprint
- Lightweight
- Diver changeable



C-MAX ICCCP Linear Anodes

Faster and more reliable installation with self-torquing snap nuts

Smaller footprint – fewer fixings

C-Max anodes have been developed by Cathelco to combine maximum performance with numerous features which speed-up installation. The advanced design means they are exceptionally lightweight and can be easily carried by one man. They also have a small footprint which means that fewer fixings are required, reducing installation time.

Diver changeability is another key feature enabling them to be replaced without the need for drydocking.

Self torquing snap-nuts save time and effort

One of the most important advances with C-Max anodes is the use of self-snapping torque nuts. When the correct torque is achieved using an ordinary wrench, the top section of the nut snaps off leaving the lower section intact for future use. No torque wrenches are required, greatly reducing the time and effort taken by divers when anodes are changed at sea. In addition, the nuts are yellow for increased visibility underwater.

Another advantage is that the plastic fixing nuts have a rubber sleeve which allows for minor discrepancies in the weld area surrounding the stud. Once tightened, they create a sealed environment around the stud which avoids the risk of stray current damage.

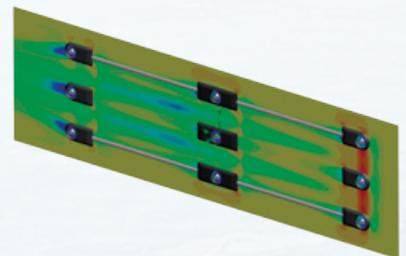
The electrical connection is made through a single connecting rod which simplifies the task for the diver at installation and when the anode needs to be changed.

Rigorous test protocols

The stability of C-Max anodes has been modelled using computerised fluid dynamic (CFD) techniques. This focuses on the effects caused by the velocity of the seawater passing over the hull surface and the pressure exerted on the anode by the moving water.

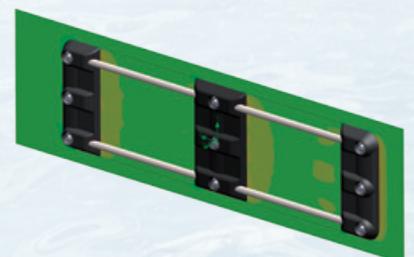
Velocity plot at back board surface +30mm

The image illustrates the flow dynamics of the anode, showing a streamlined profile with minimal turbulence as the water flows over the surface making the anode inherently stable.



Pressure plot at anode back board surface

The green areas indicate that there is positive pressure across the front surface of the anode. The pressure prevents the anode from flexing as the ship moves forward.



1 Double headed self torquing snap nut on stud.



2 Nut is tightened using ordinary wrench. Top section breaks off when correct torque is achieved.



3 The lower head allows the anode to be removed when replacement is necessary.

C-MAX ICCP Disc Anodes

Designed to be easily diver changeable

Easier installation – higher performance

C-Max disc anodes are generally used for 'forward' ICCP systems where their circular shape reduces the risk of physical damage and helps to maintain the flow dynamics at the bow of the vessel. Their low profile also avoids the problem of rubbing by anchor chains.

The current emitting face of the C-Max disc anode is made from mixed metal oxide (MMO) on a titanium substrate. This is contained within a rubber over-moulding which creates a watertight seal with the hull and protects the edge of the anode.

Special diver change tool

The C-Max disc anode has been designed to be easily changed by a diver with the assistance of a shipboard technician. Working from the inside of the ship, the first step is to unscrew the cofferdam bolts, then remove the gland assembly and disconnect the wiring. The blanking plug is removed from the cofferdam cover and used to seal the side pipe exist boss.

The cofferdam lid is then put back into position and the special diver change tool is screwed into place. As the handle is turned, the barrel presses on the anode stud and pushes the anode away from the outside surface of the hull.

The diver lifts the old anode away and replaces it with the new one. Water pressure pushes the new anode against the hull enabling the studs to be located in the cofferdam.

The diver change tool is removed allowing any remaining water to drain from the cofferdam. At this point the cofferdam lid can be removed and the anode bolted in place. All that remains is to remake the electrical connections and replace the cofferdam lid.



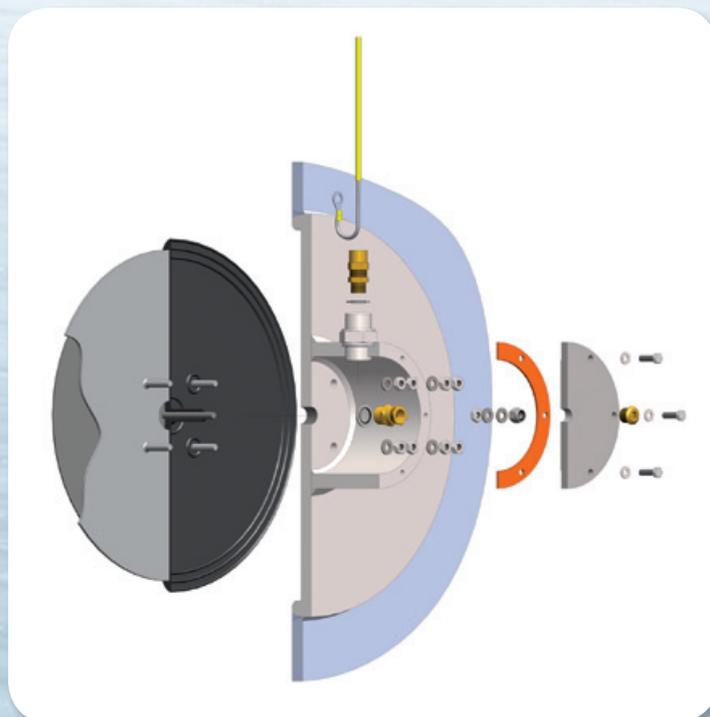
1 Picture showing blanking plug in cofferdam cover.



2 Blanking plug used to seal the boss exit.



3 Special diver change tool is screwed in place. Handle is turned to push anode away from exterior hull surface.



C-MAX ICCP Anode Specifications

C-Max Linear Anodes



50 – 75A linear anodes

These have a single current emitting tube measuring 25mm in diameter.

Size: 740mm x 400mm Weight: 7kg



100A linear anodes

To achieve an output of 100A, these anodes have a 32mm diameter tube.

Size: 740mm x 400mm Weight: 7kg



125 – 200A linear anodes

This anode is designed with two tubes each 32mm in diameter to achieve outputs of up to 200A.

Size: 740mm x 400mm Weight: 7kg



225 - 300A linear anodes

Designed for use on the largest vessels, these anodes have three tubes to produce outputs of up to 300A.

Size: 1380mm x 400mm Weight: 14kg

C-Max Disc Anodes



50 – 100A disc anodes

These anodes can be easily changed by a diver using a simple procedure.

Size: 370mm diameter Weight: 4kg



125 -175A disc anodes

Diver changeable for use on larger vessels.

Size: 526mm diameter Weight: 9kg

Reference Electrodes



Widely used on steel hulled commercial vessels, zinc reference electrodes are fully diver changeable. Robustly designed and recessed on the hull, they have excellent performance and durability.

Reference electrodes with silver/silver chloride elements are also available.

Size: 125mm diameter Weight: 9kg

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