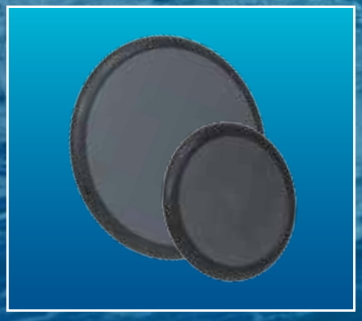
Cathelco

World leading technology for the offshore oil and gas industry

Seawater pipework anti-fouling systems

ICCP hull corrosion protection systems



Cathelco - world class expertise in the offshore oil and gas sector

Cathelco are world leading manufacturers of seawater pipework anti-fouling and hull corrosion protection (ICCP) systems for the offshore oil and gas industry.

This is based on over 50 years of experience in marine engineering and a record of more than 40,000 installations on ships and offshore structures. Today, projects range from the supply of equipment for the most advanced FPSOs to specialised 'ice class' corrosion protection for platforms operating in Arctic conditions.

An important factor in the company's growth has been the ability to constantly innovate and adapt products to provide higher performance and greater reliability. One example is the C-Max range of ICCP anodes which are diver changeable – a key feature for FPSOs and offshore platforms which are on station for prolonged periods of time.

Cathelco have also enhanced their range of control panels with the Quantum series. These store comprehensive data about the performance of the system and are designed for greater connectivity with control rooms and bridge computer systems.

The other vital ingredient which Cathelco bring to offshore projects is their design expertise in protecting the most complex structures. This particularly applies to offshore platforms, jack-up rigs and semi-submersibles where the careful positioning of anodes is essential to avoid 'shading' and to ensure that the structure receives the optimum level of corrosion protection.

There have also been significant developments in seawater pipework anti-fouling equipment with a new generation of lift pump protection units and advanced Quantum control panels for installations on FPSOs.

Cathelco operates from a modern factory in the United Kingdom, but its sales and technical support network stretches across the world with almost 50 agent/installers. In key shipping and offshore service centres such as India, Korea, Singapore and UAE, Cathelco operates its own subsidiaries. It has also established strategic stocks of equipment in Brazil, Canada, China, Germany, Iceland and South Africa.

- Pipework anti-fouling systems for seawater lift pumps.
- Pipework anti-fouling systems for FPSOs and FSOs.
- ICCP hull corrosion protection systems for offshore platforms, semi-submersibles and jack-up rigs.
- ICCP hull corrosion protection systems FPSOs and FSOs.
- World leading expertise in system design for optimum performance.
- International network of sales and service centres.

Pipework anti-fouling systems for seawater lift pumps

Effective and reliable protection against bio-fouling

Offshore structures are often situated in relatively shallow water where marine organisms breed more prolifically. This leads to blockages which can have serious consequences for the efficiency of seawater cooling equipment and fire fighting pumps.

The Cathelco seawater pipework anti-fouling system is the most widely used of its type in the world. It is based on the electrolytic principle and consists of a control panel which feeds an electrical current to copper and aluminium anodes.

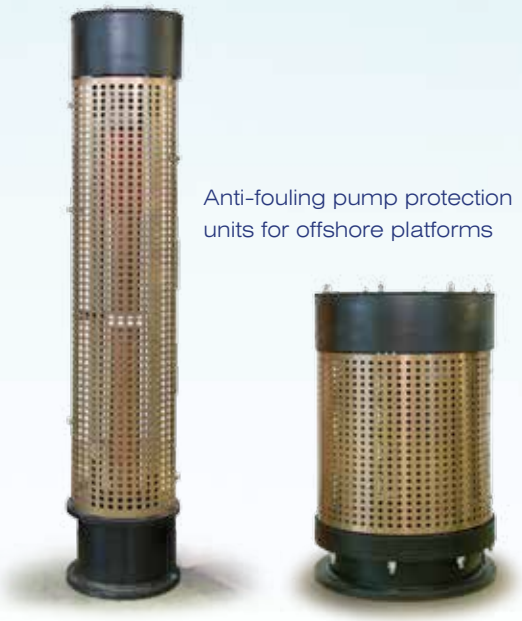
In operation the copper anode produces ions which are carried through the pipework by the flow of seawater and create an environment where barnacle and mussel larvae do not settle or grow. At the same time, the aluminium anode produces ions which create an anti-corrosive layer on the internal surfaces of pipes. With concentrations of copper at just 2 parts per billion, the system is completely safe and environmentally friendly.

Pump unit construction

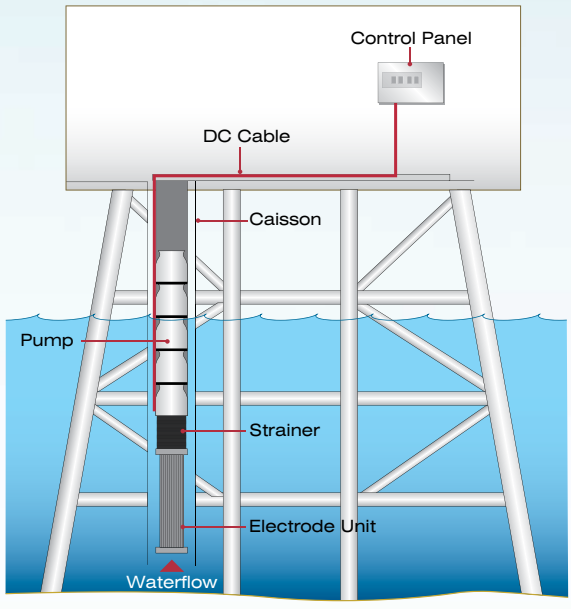
Cathelco pump protection units are designed to be mounted at the bottom of pumps, often inside the stilling tube or caisson. The copper and aluminium anodes are housed within a steel framework surrounded by a protective strainer grid. The anode mounting frame acts as a cathode creating a completely self contained unit which is electrically isolated from the pump using a specially designed isolation kit. Anode life is calculated to coincide with scheduled maintenance, typically 2 or 5 years.

Controlled dosing

Although the seawater is dosed to higher concentrations than for sea-going vessels, this is quickly dissipated throughout the pipework. The Cathelco unit is automatically activated when the pump is switched on, however, a low dosage is maintained at all times to keep the bottom of the pump and strainer area free from bio-fouling.



Anti-fouling pump protection units for offshore platforms



Pipework anti-fouling systems for FPSOs and FSOs

Protecting vital seawater services on FPSOs

Cathelco have supplied pipework anti-fouling systems for more than 30 FPSOs and FSOs around the world.

These vessels generally have numerous seawater intakes serving engine cooling, product processing, fire fighting and a range of auxiliary services which can include the provision of a potable water supply. It is essential that all of these functions are protected by an effective and reliable pipework anti-fouling system.

Strainer mounted anodes

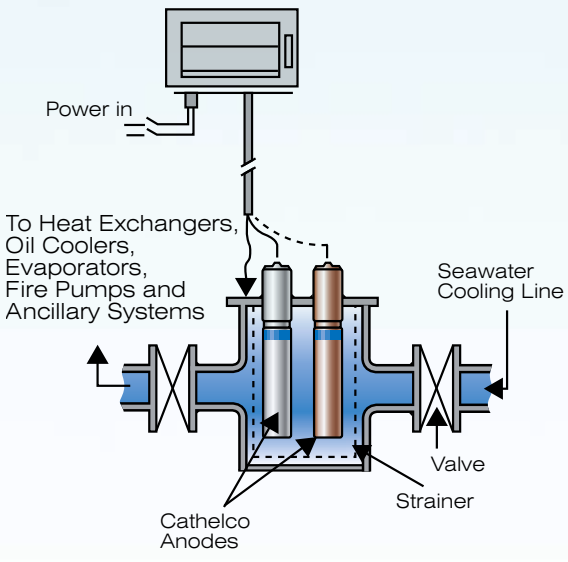
In most cases, pairs of copper and aluminium anodes are mounted within the strainers on FPSOs and FSOs. The advantage of strainer mounted systems is that anodes can be changed at any time without the need for drydocking. In these circumstances, it is recommended that some of the treated water is fed back to the seachests to ensure they are kept free from fouling.

Electrolysis tank systems

If the drydocking interval is greater than 5 years, an electrolysis tank system may be the most practical option. This involves taking a feed from one the seachests and pumping it to an electrolysis tank housing the copper and aluminium anodes. The seawater is treated at a higher dosage rate and then distributed via pipework to multiple seachests where it is diluted by the incoming flow and achieves a normal dosage rate to protect against bio-fouling.

Controls can be linked to inlet valves or pumps to automatically control the dosage between seachests which are 'in use' or 'out of use'. The units are specifically designed for each application and supplied as 'turn key' modules, skid mounted and ready for installation.

- A good solution when the dry docking interval is greater than 5 years.
- Enables anodes to be changed easily at any time.
- Automatically controls the dosage between seachests.
- Supplied as 'turn key' modules ready for installation.



ICCP systems for FPSOs and FSOs

Corrosion protection for the long term

Cathelco have produced a new generation of control panels and anodes, ideally suited to the requirements of FPSOs and FSOs which may be stationed at sea for many years without the opportunity for drydocking.

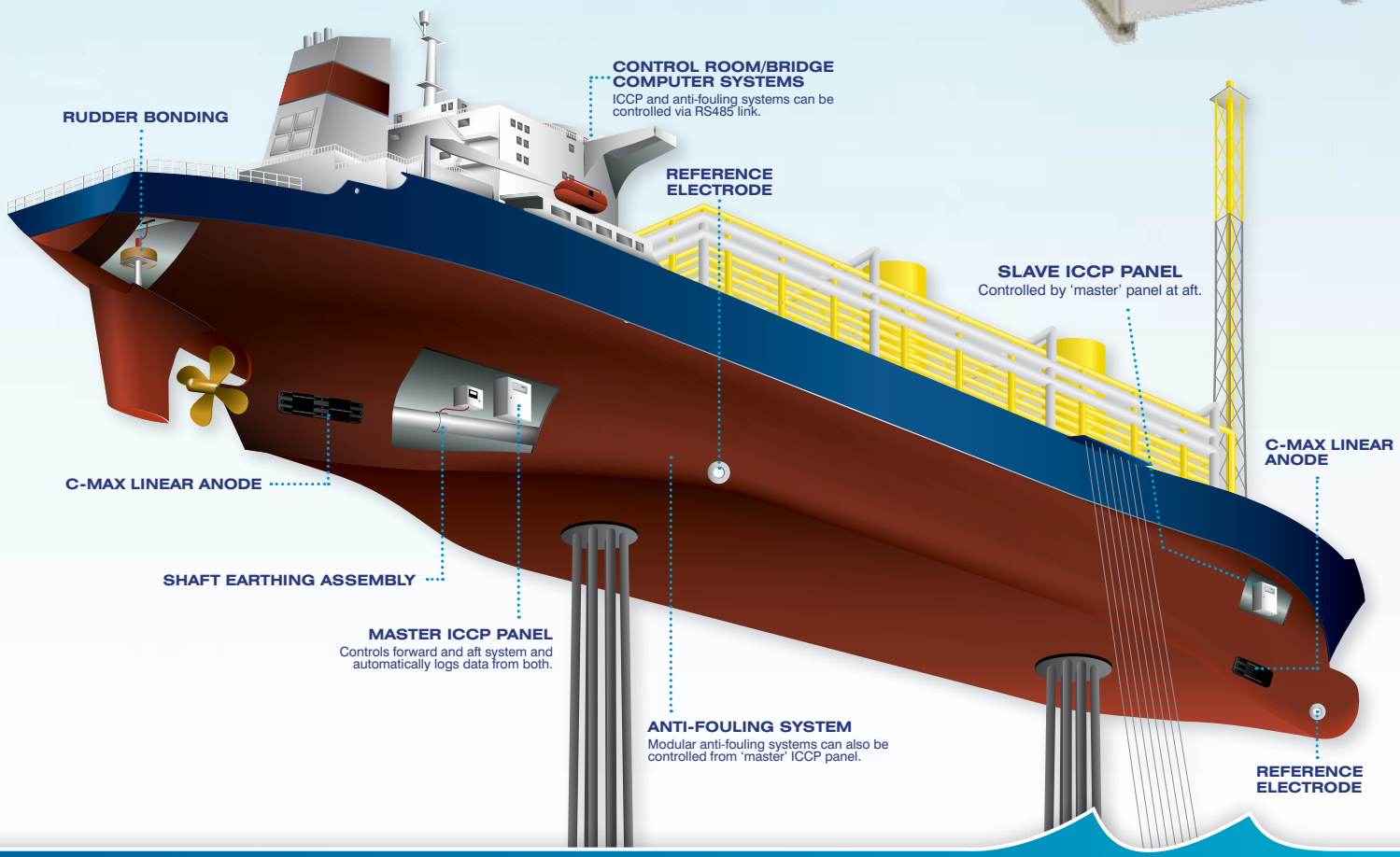
After an operational period of 20 years, paint loss may exceed 80% and therefore it is essential to have an ICCP system which meets the demand for effectiveness and long lasting reliability.

C-Max anodes – diver changeable

The key feature of C-Max anodes is that they are diver changeable – an important consideration on FPSOs with long drydocking intervals. Lightweight and easy to handle, they have a small footprint, but emit a relatively powerful current from a small surface area. They are fitted using self-torquing snap nuts, eliminating the need for torque wrenches. This greatly reduces the time and effort taken by divers when replacement is carried out at sea.

Quantum control panels

The new range of Quantum control panels make ICCP systems easier to control and monitor. In addition to providing the power supply, they store comprehensive information about the performance of the system. An RS485 link enables this data to be relayed to a control room or bridge computer system. Another advantage is that the data can be uploaded to a USB stick and emailed to Cathelco for detailed analysis, avoiding the need to complete and return paper log sheets.



ICCP systems for semi-submersibles

Expertly designed systems to prevent corrosion

Cathelco have considerable experience in the design of ICCP systems for semi-submersibles for both newbuild and retrofit projects.

ICCP systems offer a number of advantages in comparison with the use of sacrificial anodes. In addition to cost and weight savings, one of the main benefits is that the level of protection can be adjusted according to whether the semi-submersible is in transit between locations or operating at working draught.

The design can also incorporate an allowance for the protection of equipment which represents a 'current drain' such as mooring chains, drilling equipment and fairleads.

Advanced anodes and control panels

ICCP systems on semi-submersibles consist of arrangement of anodes and reference electrodes which are mounted on the pontoons and wired to a control panel(s). Cathelco offer a range of anodes to suit the particular protection requirement which can be either recessed or surface mounted. The latest C-Max anodes are easy to install, diver changeable and emit a powerful current from a relatively small surface area. Quantum control panels store comprehensive data about the performance of the system which can be relayed to control rooms via an RS485 link. They allow the system to be easily monitored and adjusted in relation to the operating conditions.

Retrofit systems – preserving ageing assets

Retrofits generally have to be undertaken within a very tight time frame. One of the problems with sacrificial systems is that many anodes have to be removed and replaced. ICCP systems, on the other hand, use fewer anodes enabling the system to be installed more quickly, whilst providing a more versatile and effective solution.

In retrofit applications, a further advantage is that the system can be designed to compensate for the degree of coating loss, ensuring effective protection at any stage in the life of the structure.

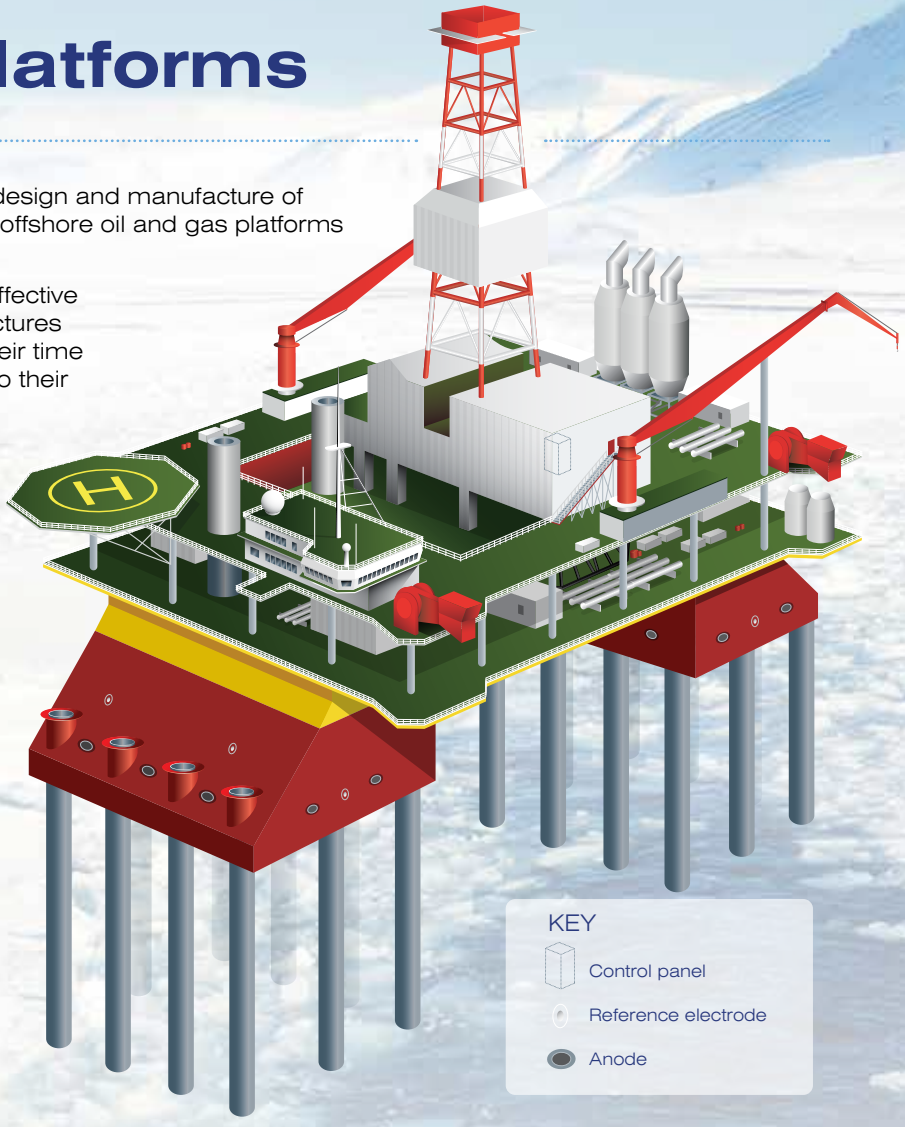
Projects are carefully co-ordinated by Cathelco including equipment design according to access requirements, logistics and diver support.

ICCP systems for ice class platforms

Cathelco have world leading experience in the design and manufacture of ice class ICCP corrosion protection systems for offshore oil and gas platforms operating in Arctic conditions.

The systems are expertly designed to provide effective corrosion protection for large and complex structures which will inevitably suffer coating loss during their time in operation, making ICCP protection essential to their structural integrity.

To achieve this long lasting performance, Cathelco have designed ice class anodes and reference electrodes to withstand the pressure of winter ice, together with thyristor control panels which provide outstanding reliability.



Ice class anodes

Robustly designed to resist winter ice, the anodes have a relatively large surface area to provide a greater output. They are made from extra thickness plate and have current emitting faces with a layer of mixed metal oxide (MMO) which is three or four times thicker than conventional anodes. Ice deflectors can be fitted around the anodes to provide further protection.

Reference electrodes

These are used to measure the electrical potential at the hull/seawater interface and send a signal to the control panel which raises or lowers the anode output.

Control panels

Arctic waters contain more fresh water and are less saline. This results in higher resistivity which means that a more powerful 'driving' force is required to achieve the necessary level of cathodic protection. Therefore, Cathelco use 50 volt thyristor control panels which combine cost effectiveness with proven reliability. The largest 1,000 amp panels enable 8 anodes and 4 reference electrodes to be controlled from an individual unit.

Information systems - Quantum

The latest 'Quantum' control panels store comprehensive data about the configuration of system which can be viewed through a series of displays. They also automatically log data concerning the performance of the system. An RS485 link enables this information to be relayed to a central control room where the system can be easily monitored. Furthermore, data can be uploaded on a USB stick and e-mailed to Cathelco for analysis.

A portfolio of products for the offshore, shipping and renewable energy markets

Ballast water treatment systems

The BWT systems are based on combination of filtration and UV technology with capacities from 34m3/hr to 1,200m3/hr. Completely chemical free, they offer precise dosing, stepless power control and a unique cleaning system. The units are IMO approved and have received U.S. Coast Guard AMS acceptance.

Reverse osmosis desalinators

A range of watermakers with outputs up to 50 cubic metres per day for use on all types of craft including supply vessels, offshore platforms and FSOs. Easy to install and operate, the desalinators provide fresh water for a wide variety of domestic uses.

ICCP systems for offshore wind turbines

These ICCP systems have been specifically designed to protect the underwater foundations of wind turbine towers against corrosion. Performance data is automatically recorded and systems can be monitored and controlled from an on-shore base.

Worldwide Service Network

Our worldwide network of sales and service centres can provide immediate advice and assistance on the complete range of Cathelco products. Agents' contacts details are available on our website: **www.cathelco.com**

Abu Dhabi	Italy
Algeria	Japan
Argentina	Korea *(Seoul & Pusan)*
Australia	Malaysia
Belgium	Mexico
Brazil	New Zealand
Bulgaria	Norway
Canada *(East & West Coast)*	Peru
Chile	Philippines
China *(Hong Kong, Shanghai, Qingdao)*	Poland *(Gdansk & Szczecin)*
Croatia	Portugal
Cyprus	Romania
Denmark	Russia *(Murmansk, St Petersburg, Vladivostok)*
Ecuador	Singapore
Egypt	South Africa *(Durban & Cape Town)*
Finland	Spain
France *(Atlantic & Mediterranean Coasts)*	Sweden
Germany	Taiwan *(Kaohsiung & Taipei)*
Greece	Thailand
Holland	Turkey
Iceland	United Arab Emirates
India	USA *(East, West & Gulf Coasts)*
Indonesia	Vietnam
Ireland	Venezuela

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