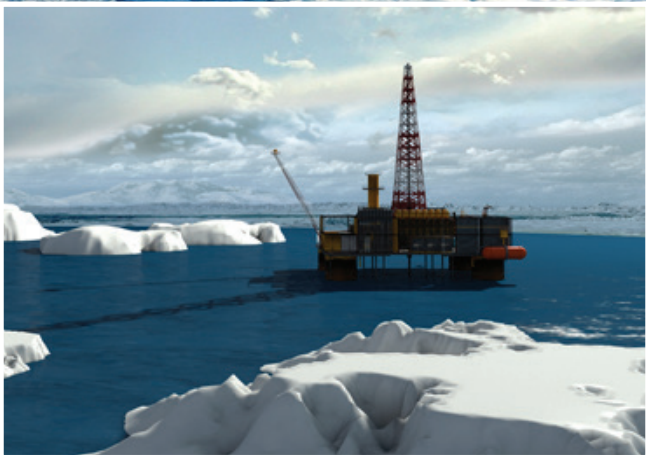


Cathelco



Ice class ICCP
corrosion protection
systems for ships
and offshore
platforms

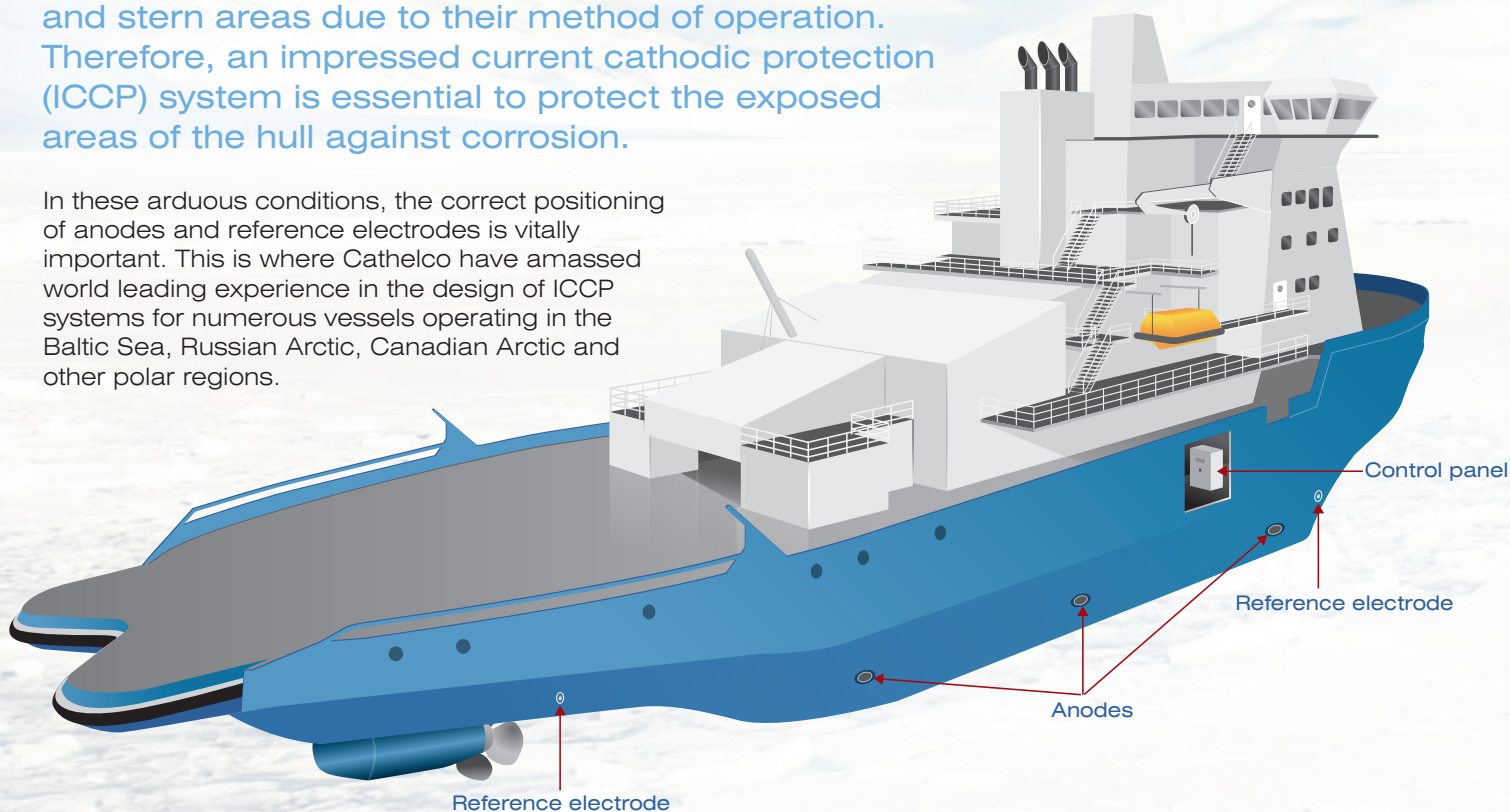


World leading experience in
ice class protection

ICCP systems for **ice breaking vessels**

Ice breaking vessels suffer severe coating loss in bow and stern areas due to their method of operation. Therefore, an impressed current cathodic protection (ICCP) system is essential to protect the exposed areas of the hull against corrosion.

In these arduous conditions, the correct positioning of anodes and reference electrodes is vitally important. This is where Cathelco have amassed world leading experience in the design of ICCP systems for numerous vessels operating in the Baltic Sea, Russian Arctic, Canadian Arctic and other polar regions.



System design

Cathelco ICCP equipment for ice breaking vessels generally consists of forward and aft systems to protect the vulnerable bow and stern areas against corrosion. The anodes and reference electrodes are positioned below the 'ice belt' on the hull where they are less exposed to the abrasive action of the ice. To reduce the risk of damage and overcome the higher resistivity of Arctic waters, small sized, multiple anodes and reference electrodes are installed. Typically six anodes and four reference electrodes are used to provide an in-built degree of redundancy as a safety measure.

Ice class anodes

Recessed elliptical anodes are used to minimise the effects of impact and abrasion by ice. These specially strengthened anodes have a plate thickness considerably greater than conventional anodes and the current emitting faces have a layer of mixed metal oxide (MMO) which is three or four times thicker than standard designs.

Reference electrodes

Made with zinc elements, the reference electrodes 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

Because Arctic waters are colder and less saline than typical sea water, a more powerful driving force is required to operate the ICCP system effectively. For this reason, Cathelco supply 50 volt thyristor control panels which have proved their reliability on vessels in the polar regions.

Information systems

Customers have the option of Quantum control panels enabling forward and aft systems to be operated in a 'master' and 'slave' configuration. This allows the forward ICCP system to be controlled by the aft panel and information about the whole system can be viewed in one location. Data concerning the performance of the system is logged automatically and an RS485 link enables it to be relayed to a control room or bridge systems. The data can also be uploaded to a USB stick and emailed to Cathelco for analysis.



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.

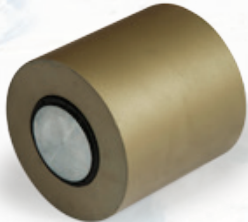
The systems are expertly designed to provide effective corrosion protection for large and complex structures which will inevitably suffer coating loss during their time in operation, making ICCP protection essential to their structural integrity.

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.

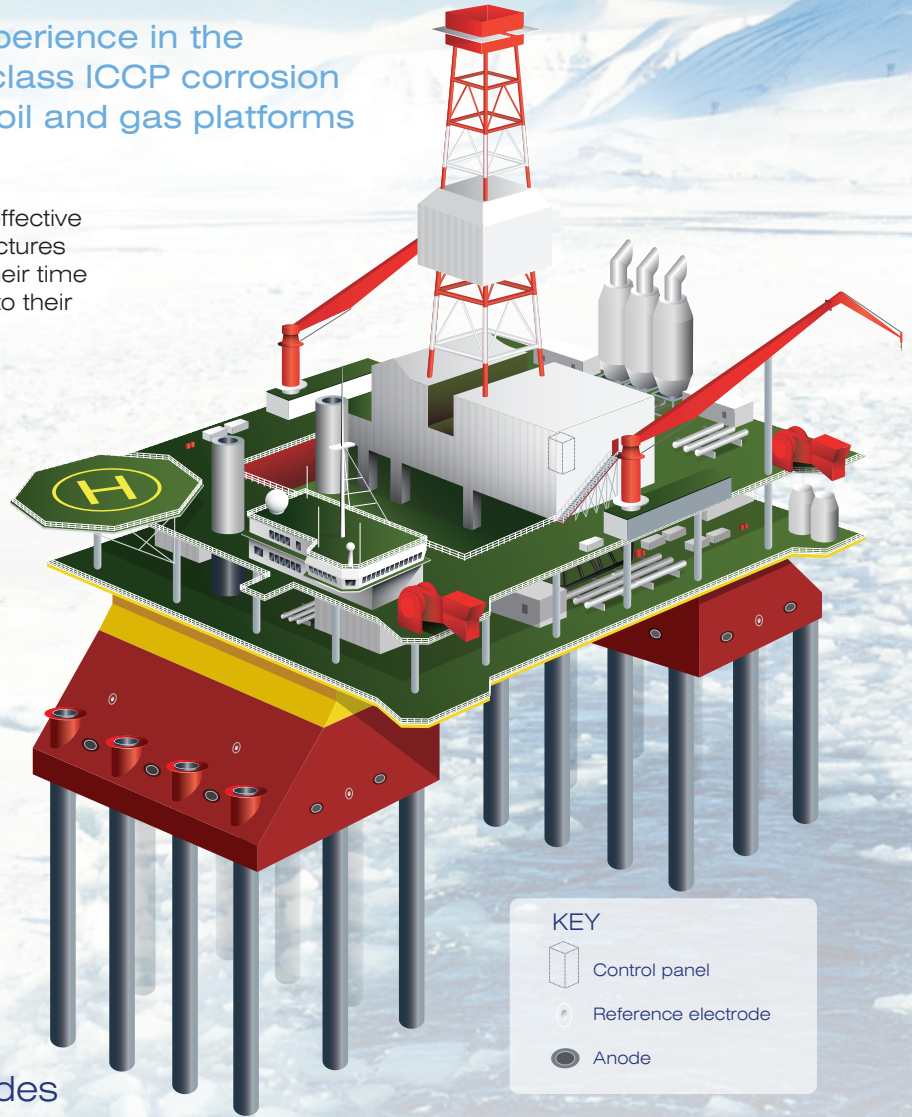


Reference electrodes

These are used to measure the electrical potential at the hull/seawater 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 shipping, offshore and renewable energy markets

Ballast water treatment systems



Seawater pipework anti-fouling systems



Reverse osmosis desalinators



ICCP systems for offshore wind turbines



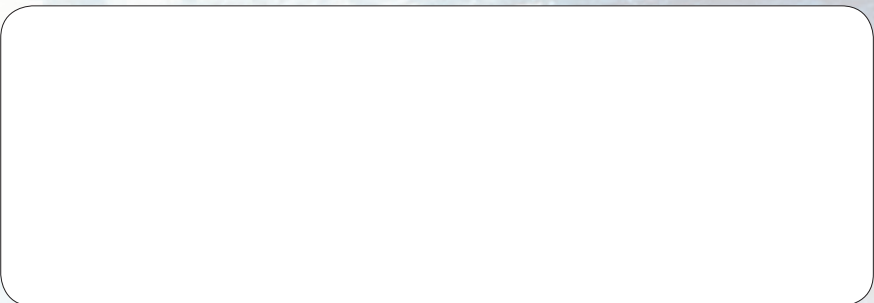
Reference list

Examples of ice class vessels

Earl Grey	Canadian Coast Guard
Terry Fox	Canadian Coast Guard
Aqviq	Canadian Coast Guard
Federal Baffin	Fednav, Canada
Federal Franklin	Fednav, Canada
Arctic	Fednav, Canada
Newfoundland Lynx	Fisheries Products Int., Canada
Newfoundland Otter	Fisheries Products Int., Canada
Seagard	Bror Hysell, Finland
Purha	Fortum Oil & Gas, Finland
Jurmo	Fortum Oil & Gas, Finland
Futura	Fortum Oil & Gas, Finland
Mistral	Godby Shipping, Finland
Miranda	Godby Shipping, Finland
Visby	Gotland Reederei, Sweden
Gotland	Gotland Reederei, Sweden
Freidrich Russ	Ernst Russ, Germany
Elisabeth Russ	Ernst Russ, Germany
Caroline Russ	Ernst Russ, Germany
Pauline Russ	Ernst Russ, Germany
Yury Topchev	Gazflot, Russia
Moskva	Rosmorport FSUE, Russia
Sankt Petersburg	Rosmorport FSUE, Russia
Kirill Lavrov	Sovcomflot, Russia
Ice breaking multi-purpose vessel	Sovcomflot, Russia
3 diesel powered ice breakers	Rosmorport FSUE, Russia
Diesel electric ice breaker	Rosmorport FSUE, Russia
Nuclear ice breaker	RosAtomFlot, Russia
Mikhail Ulyanov	Unicom Management, Cyprus

Examples of ice class platforms

Riser block RB-1	Lukoil – Filanovsky field
2 living quarters platforms (LQP/PGM)	Lukoil – Filanovsky field
2 ice resistant drilling/production platforms (IRFP/LSP1)	Lukoil – Filanovsky field
Block conductor	Lukoil - Korchagin field



Cathelco Ltd, Marine House, Dunston Road, Chesterfield S41 8NY United Kingdom

Telephone: +44 (0) 1246 457900 Fax: +44 (0) 1246 457901

Email: sales@cathelco.com Web: www.cathelco.com