

MPM MARINE PROJECT MANAGEMENT, INC.



Subsea Impressed Current Cathodic Protection System (ICCP)

Generation IV

MPM Gen IV ICCP System Models

The MPM ICCP system is available in three models, each designed for specific requirements and budgets:

- Gen IV HO** High output (350-800 amps)
- Gen IV STD** Standard output (230-600 amps)
- Gen IV LD** Light Duty, standard output, developed for benign site conditions (harbors) and smaller structures

MPM Gen IV ICCP System Benefits

Reliable

Offers long term protection, with a design life up to 50 years. Continuous monitoring & alarms available, which identify failure or unintentional shut down. MPM Generation II ICCP systems have been in operation since 1996 with zero failures, including systems installed in 2002 at water depths of 850 feet.

Cost Effective

The MPM system requires no subsea maintenance, with a guaranteed operational design life. Requires a one-time installation, and costs up to half that of traditional cathodic protection retrofits.

Sound Design

All materials and components are of the highest quality, thoroughly tested, and designed and manufactured specifically for MPM. The system is designed to withstand site specific hazards such as severe weather, currents, earthquakes,



MPM Impressed Current Cathodic Protection System (ICCP)

MPM's Generation IV Impressed Current Cathodic Protection System (ICCP) provides subsea corrosion protection that is dependable, cost effective, and designed for long term operation. MPM sleds, which house mixed metal oxide (MMO) anodes, have been utilized for corrosion protection of platform jackets and subsea pipelines in water depths up to 1,075 feet. Design enhancements incorporated in the Generation IV system now provide an output of up to 800 amps.

The Gen IV ICCP system has been installed utilizing Remotely Operated Vehicles (ROVs) and/or divers. MPM provides complete retrofit system design, system manufacture, installation, and overall project management from project inception through commissioning.

Each MPM ICCP system is tailored to the facility requirements and design life, and can provide a service life ranging from 10 to 50 years.



MPM Gen IV Anode Sleds

MPM GEN IV anode sleds house mixed metal oxide (MMO) mesh anodes. The sled is a molded fiberglass structure with protective gratings above and below the anode. The fiberglass components are non-corrosive and chlorine compatible, eliminating risks of deterioration. The MPM anode sled is low profile and trawl friendly, incorporating ROV compatible installation and recovery rigging features.

The MMO anode is protected from damage during installation, dropped/lost article impact and ROV contact. The sleds are ballasted utilizing a proprietary concrete mix design that is seawater and chlorine compatible. The sled's structural design withstands 2G dynamic loads, allowing offshore dynamic lifting during installation.

Anode Sled Features

The anode sled structure is designed to accept the full power cable installation and in-service loads through the sled.

The MPM anode sleds are also equipped with handling appurtenances to aid in fabrication, installation, and recovery.

Anode Sled Specifications

High Output Model (HO)

Weight

Shipped = 970 lbs

Completed Dry Weight = up to 9,600 lbs
(includes concrete ballast)

Dimensions

120 in. long x 96 in. wide x 29 in. high
trawl-friendly, low profile design

Standard Model (STD)

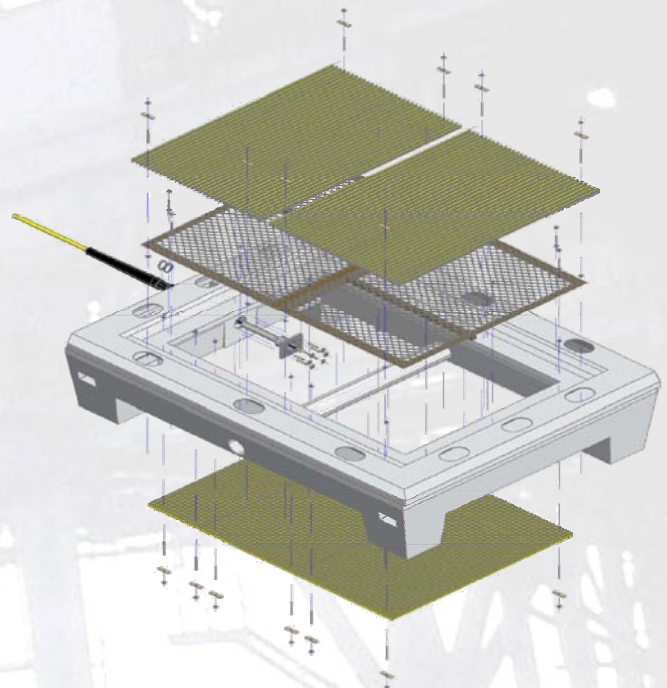
Weight

Shipped = 780 lbs

Completed Dry Weight = up to 7,900 lbs
(includes concrete ballast)

Dimensions

96 in. long x 72 in. wide x 29 in. high
trawl-friendly, low profile design



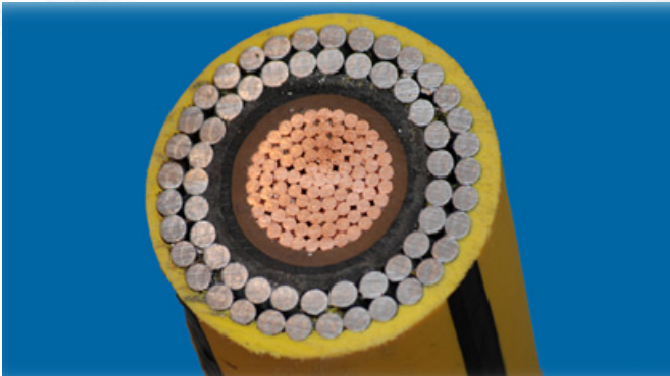
System Components

Anodes

The MPM Gen IV system utilizes dimensionally stable mixed metal oxide mesh anodes, with a design life of up to 50-years, sized to provide from 230-800 amp output throughout the design life.

Subsea Power Cables

MPM's Standard and HO sled power cables are either single armored or contra-helically wound double armored, both with an HDPE outer jacket. The cables are available in 350, 500, 750, 1000 or 1100 kcmil.



Power Cable Connections

MPM's proven power cable electrical connection is terminated utilizing a single connection directly to the anode.

Electrical: Hydrottested to 800 psi (1,800 feet of seawater).

Mechanical: Torque and tension tested to 1.5 times the cable's safe working load (SWL).

Rectifiers

MPM's provides oil immersed rectifiers/transformers, supplying up to 500 amps to the subsea anode sleds. The rectifier cases are 316L stainless steel, and are supplied with appropriate appurtenances to allow SCADA interface to voltage and amperage input/output.

Power Cable Conduits (I-Tubes)

MPM's existing power cable I-tube and I-tube clamp designs are based on either US West Coast or Gulf of Mexico environmental forces.





MPM Company Highlights

2010

- √ MPM celebrated its 14th year in business.
- √ MPM celebrated its safety record of more than 1,735,000 man hours of work performed by MPM and its subcontractors accident free.
- √ MPM delivers eight Gen IV anode sleds for installation at 1,100 feet of water on platform Heritage for ExxonMobil.

2009

- √ MPM completes design and testing of the Gen IV impressed current anode sled.
- √ MPM receives an audited "A Contractor" Rating from Chevron.

2008

- √ MPM receives "Project Excellence" Award from Plains Exploration and Production (PXP).
- √ MPM installed 7-impressed current anode sleds on multiple oil and gas production platforms in the Cook Inlet, AK. Projects were performed under contract to Chevron.

MPM Safety

MPM has a **100% accident free** safety record, and has extensive experience in successfully planning and implementing projects in the environmentally sensitive waters of Alaska, California, and the Gulf of Mexico.

MPM has received an audited "A Contractor" Rating from Chevron, and a "Project Excellence" Award from Plains Exploration and Production (PXP).

To ensure that all operations are completed without accident or incident, we have developed and implemented an active behavioral based health, safety, and environmental (HSE) program.

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