

## Impressed Current Cathodic Protection

Anodes / Mixed Metal Oxide (MMO) Wire and Ribbon

PS 02.002

# Mixed Metal Oxide (MMO) Wire and Ribbon

Hockway's Mixed Metal Oxide wire anodes comprise of a titanium wire or ribbon coated in a mixed metal oxide coating of iridium (IrO<sub>2</sub>) and Tantalum (Ta<sub>2</sub>O<sub>5</sub>).

The MMO coating shows a number of advantageous properties including:

- Excellent conductivity
- Resistance to acidic environments
- Chemical stability
- Relatively low consumption rates (approx 4 microgram/A.yr)
- Suitable for use in both chlorine and oxygen evolving electrolytes
- Life over 50 years
- Simple and easy to install

## Wire

Wire anodes are used to protect in congested and close proximity locations to the structure providing optimized current distribution.

The wire anodes can be manufactured in various forms to suit the intended application:

- Long lengths of MMO wire connected at regular intervals to a header cable
- With the anode encased within a cotton bag filled with coke backfill

## Typical Applications

Under tank protection  
Close anode systems for pipelines  
Internal Tank Protection

## Chemical Composition

Substrate	Titanium (ASTM B348 Grade 1 or 2)
Coating	IrO <sub>2</sub> / Ta <sub>2</sub> O <sub>5</sub>
Electrical Resistance	1.5mm dia.wire – 0.248 ohms/m 3.0mm dia.wire – 0.062 ohms/m

## Operating Characteristics

Environment	Maximum Current Density	Life
Soil	50 A/m <sup>2</sup>	20 years
Carbanaceous Backfill	100 A/m <sup>2</sup>	20 years
Fresh Water	100 A/m <sup>2</sup>	20 years
Brackish Water	100-300 A/m <sup>2</sup>	20 years
Sea Water	600 A/m <sup>2</sup>	20 years

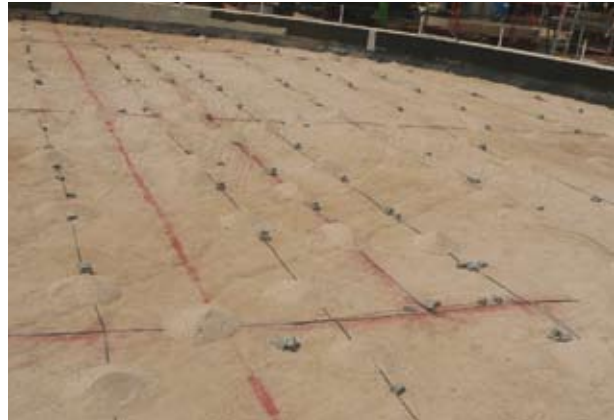
Current outputs adjusted for use in calcined petroleum coke breeze – 100A/M<sup>2</sup>



Example of loop system  
Image courtesy of Ceranode



MMO Linear Anode alongside pipeline



MMO Ribbon Anode for Undertank CP

## Ribbon

Ribbon MMO anodes are primarily used in the protection of undertank Above Ground Storage Tank base plates.

Mesh Ribbon MMO Anodes are used in concrete Cathodic Protection for the protection of the concrete rebar.

Titanium ribbon acts as an inert conductor to electrically connect the MMO ribbon anode and reduce attenuation losses and also connects to the positive cable via rod connectors. The titanium ribbon is connected to the MMO anode by spot welds applied at the point of crossover.

### Nominal Dimensions of Solid Ribbon

Width	6.35mm (0.25")
Thickness	(0.635mm (0.025"))
Standard Coll Length	100m
Standard Coil Weight	1.12kgs
Surface Area of Ribbon	0.014m <sup>2</sup> per/m

### Operating Characteristics

Environment	Maximum Current Density	Life
Fine Sand	12.8mA/ft (42mA per m)*	20 years
Concrete	0.45 mA/ft (1.5mA per m)**	20 years

\* When operating at an anode current density of 0.278 A/ft<sup>2</sup> (3 A/m<sup>2</sup>)

\*\* When operating at an anode current density of 10.19 mA/ft<sup>2</sup> (110 mA/m<sup>2</sup>)

### Titanium Conductor Bar Dimensions

Width	12.7mm (0.50")
Thickness	0.9mm (0.035")
Standard Coll Length	100m
Standard Coil Weight	3.8kgs

## Contact

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