

## IMPRESSED CURRENT ANODE



*MMO Anode Tubular*

### MIXED METAL OXIDE ANODE (TUBULAR)

#### Information

Titanium is chemically resistant & mechanically robust. Mixed Metal Oxide when coated over Titanium activates the latter. The Mixed Metal Coating has an excellent Electrochemical property. The evolution of Oxygen & Chlorine and / or mixtures of the two Gases can be established with a Low Stable Anode Potential.

#### Composition

Mixed Metal Oxide Coating is a combination of precious groups of Metal Oxides. The Oxide composition has been extensively developed for optimized Electrochemical & Long lifetime in the various Cathodic Protection Environments.

#### Lifetime

BSS Tech recognizes the simultaneous generation of Chlorine & Oxygen on the stringent environment the Anode inhabit. And so we provide Mixed Metal Oxide to withstand these harsh conditions. Concurrent Anodic generation of Chlorine & Oxygen occurs in Low Salinity / Brackish / Fresh Water. Hydrogen ions co-generated with Oxygen have a particular stagnant Electrolyte flow, which results in very acidic conditions at the Coated Electrolyte Interface. Mixed Metal Oxide Anodes are designed to resist acidic conditions & the coating to the Titanium Interface is protected from Anodic and Chemical attack. It has a very low wear rate in the range of 0.5 to 4 mg/A-year; depending on the specified Cathodic Protection Application & Conditions. The long lifetime behaviour is only because of the Low Electrochemical wear of the Coating provided for a stable low Anodic Operating Potential. We design our Mixed Metal Oxide Tubular Anodes for a lifetime of 10 to 30 years, even longer depending upon the Application & Customer requirement.

#### Current Outputs

Mixed Metal Oxide Anodes have High Current Outputs. The recommended maximum Current Density depends upon the Resistivity & Composition of the Electrolyte. As with all Anode Systems, the lifetime is a function of the Current Density.

The recommended maximum current outputs are:

Sea water	750 A/m <sup>2</sup>	Brackish/ Fresh water	150 A/m <sup>2</sup>
Soil (Carbonaceous Backfill)	100 A/m <sup>2</sup>	Mud	50 A/m <sup>2</sup>

#### Dimension & Size

BSS Tech Mixed Metal Oxide Tubular Anodes are available in all Lengths & Diameters. We also provide other types of Mixed Metal Oxide Anodes which includes: Rods, Wires, Discs, Sheet, Expanded Mesh, Strip and can be tailor made to suit our Customer's Specification & Requirements. Canistered MMO Anodes also available with different sizes.

#### Applications

Major applications for Mixed Metal Oxide Anodes include:

- Internal Cathodic Protection for Tanks, Condensers & Heat Exchangers, etc.
- External Cathodic Protection on Pipeline, Ships, Platforms, Jetty Structures, Offshore Structures, Seawater intake structures.
- Buried Structures (used with Carbonaceous Backfill)
- Tank Bottom Protection

## MIXED METAL OXIDE RIBBON ANODE

### Information

Titanium is chemically resistant & mechanically robust. Mixture of Metal Oxide when coated over Titanium, activates the latter. The Mixed Metal Coating has an excellent Electrocatalytic property. The evolution of Oxygen & Chlorine and / or mixtures of the two Gases can be established with a Low Stable Anode Potential.

### Composition

Mixed Metal Oxide Cathodic Protection Coating is a combination of precious groups of Metal Oxides. The Oxide composition has been extensively developed for optimized Electro Chemical & long lifetime in the various Cathodic Protection Environments.

### Lifetime

BSS Tech recognizes the simultaneous generation of Chlorine & Oxygen on the stringent environment the Anodes inhabit. And so we manufacture Mixed Metal Oxide to withstand these harsh conditions. Concurrent Anodic generation of Chlorine & Oxygen occurs in Low Salinity / Brackish / Fresh water . Hydrogen ions co-generated with Oxygen have a particular stagnant Electrolytic flow, which results in very acidic conditions at the Coated Electrolyte Interface. Mixed Metal Oxide Anodes are designed to resist acidic conditions & the coating to Titanium interface is protected from Anodic & Chemical attack . It has a very low wear rate in the range of 0.5 to 4mg/A-year; depending on the specified Cathodic Protection Application & Conditions . The long lifetime behaviour is only because of the Low Electrochemical wear of the Coating provided for a stable low Anodic operation potential. We design our Mixed Metal Oxide Ribbon Anodes for a lifetime of 10 to 40 years, or even longer depending upon the Application & Customer requirement.

### Current Outputs

Mixed Metal Oxide Anodes can have different output ratings based on the life & current requirements . The recommended maximum Current Density depends upon the Resistivity & Composition of the Electrolyte as with all Anode systems, the lifetime is a function of the Current Density.

The recommended current outputs are:

Size (Width x Thickness)	Current Output				
0.25" x 0.025" (6.35mm x 0.635mm)	17 mA/m	33 mA/m	42 mA/m	70 mA/m	105 mA/m

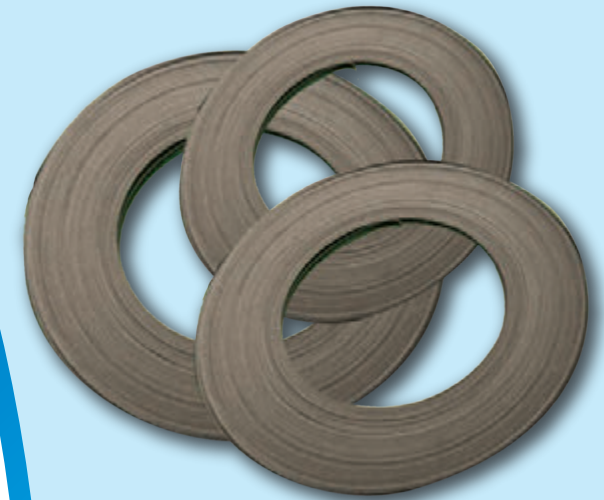
### Applications

Mixed Metal Oxide Ribbon Anode is primarily used for Tank Bottom Cathodic Protection System.

### Packing

Mixed Metal Oxide Ribbon Anodes are available in rolls of 250 feet or 500 feet.

## IMPRESSED CURRENT ANODE



### *Mixed Metal Oxide Ribbon Anode*