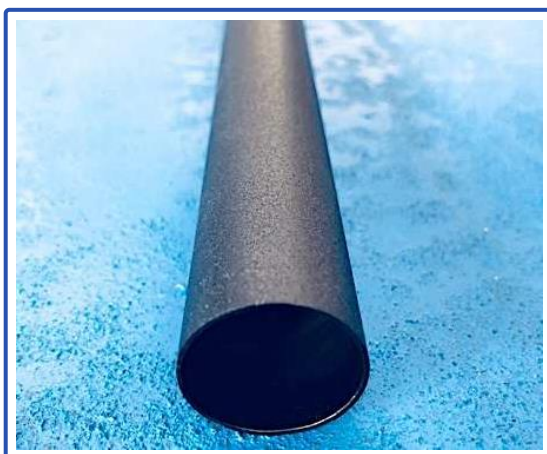


# Activated titanium Tubular Anodes coated with mixture of metal oxides

## General

The Tube Anodes consist of titanium tubes coated with metal oxide (MMO).

- Delivered in lengths up to 1.2 meters, they can be easily cut to different lengths, depending upon the CP current needs and specific applications.
- Used for soil and sea water applications, single use, canistered or assembled in chain. Used for deep and horizontal ground-beds.
- Tubular anodes can be connected to each type of cables with epoxy resin protected central connections.



Tube Anode Ø25mm

## Specifications

FORMAT: TUBE	Material	TITANIUM ASTM B338 / B861 Grade1/2 – MMO Coating	
DIMENSIONS	Diameter	25.4 mm	32 mm
	Maximum Length	1000 mm	1200 mm
	Thickness	0.9 mm	1.15 mm
PROPERTIES	Coating	TaOx - IrOx Multilayer	
	Design Life (years)	35 (soil) / 50 (seawater)	50 (seawater)
MAXIMUM CURRENT * OUTPUT / METER (Temperature 5-70 °C)	SOIL (with backfill)	8 A/m	//
	FRESH WATER	10 A/m	//
	SEA WATER	48 A/m	55 A/m

\* different coating types are available in order to meet higher current output and longer anode life requirements.

## Anodes for sea water

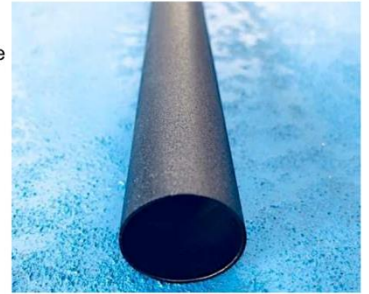
### CATHODIC PROTECTION

# Tube Anode 25 MM for Seawater

Data Sheet Revision: March 2018

#### Typical Installations

Titanium tube MMO activated, used as anode for Impressed Current Cathodic Protection of submerged structures in marine environments - seawater.



Tube Anode 25 mm

#### Technical Data

Substrate	Material
	Choice of: Titanium ASTM B338 / B861 Grade 1 / 2
	Diameter 25,4 mm **
	Length 1000 mm
	Thickness 0,9 mm
Pre coating treatment	
	Degreasing
	Sandblasting
	Etching
	Thermal Ceramic Protective Underlayer Formation (TiO <sub>2</sub> + Ta <sub>2</sub> O <sub>5</sub> )
MMO	Coating
	TaOx - IrOx Multilayer Tantalum / Iridium mixed oxides thermally formed
Iridium Load	
	According to duration requested: 50 years of operation in sea water
Coating tests	Iridium Load measurements
	X Ray Analyser: NITON XL2 800
Adhesion Test	
	ASTM D 3359 - 09 e2
Standard Coating Electrochemical Tests	
	NACE TM 0108 - 2012 (External - performed by third party)
	High current density accelerated (Internal)
Electrical	Current Output
	Designed Life (Years)
	Current
	48 A
Delivery	Packaging
	Wooden box

\*\* 32 mm diameter version also available in order to meet higher current output requirements.

## Anodes for backfill

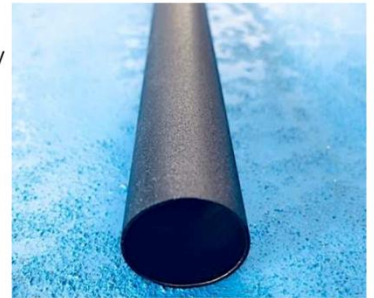
### CATHODIC PROTECTION

## Tube Anode 25 mm in Coke Backfill for soil uses

Data Sheet Revision: March 2018

#### Typical Installations

Titanium tube MMO activated, used as anode for Impressed Current Cathodic Protection of underground structures, directly in soil or embedded in backfill carboncoke.  
Applications: Vertical - Horizontal - Deep - Open Holes



Tube Anode 25 mm

#### Technical Data

Substrate	Material
	Choice of: Titanium ASTM B338 / B861 Grade 1 / 2
	Diameter 25,4 mm
	Length 1000 mm
	Thickness 0,9 mm
	<b>Pre coating treatment</b>
	Degreasing
	Sandblasting
	Etching
	Thermal Ceramic Protective Underlayer Formation (TiO <sub>2</sub> + Ta <sub>2</sub> O <sub>5</sub> )
<b>MMO</b>	<b>Coating</b>
	TaOx - IrOx Multilayer Tantalum / Iridium mixed oxides thermally formed
	<b>Iridium Load</b>
	According to duration requested of 35 years of operation in calcined petroluem coke breeze backfill
<b>Coating tests</b>	<b>Iridium Load measurements</b>
	X Ray Analyser: NITON XL2 800
	<b>Adhesion Test</b>
	ASTM D 3359 - 09 e2
	<b>Standard Coating Electrochemical Tests</b>
	NACE TM 0108 - 2012 (External - performed by third party)
	High current density accelerated (Internal)
<b>Electrical</b>	<b>Current Output</b>
	Designed Life (Years)
	Current Load
	Current Density
	8 A
	100 A / m2
<b>Delivery</b>	<b>Packaging</b>
	Wooden box

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