

MMO Tubular Anode for Cathodic Protection

MMO-coated titanium tubular anodes on ASTM B338 Gr1/Gr2 tube for impressed current cathodic protection, $\Phi 16$ – $\Phi 32$ mm, 0.5 m and 1 m, single or cable-connected strings.

Key Specifications

Substrate	Titanium tube, ASTM B338 Grade 1 / Grade 2
Coating	Iridium-based MMO (Ru-Ir or Ir-Ta system)
Sizes	$\Phi 16$, $\Phi 19$, $\Phi 25$, $\Phi 32$ mm × 500 / 1000 mm
Current rating	≈100 A/m ² in soil and fresh water; up to 600 A/m ² in seawater
Design life	20 years (other lives designed to order)
Coating thickness	≥ 4 μm

Standard Sizes and Current Ratings

Size (OD × length, mm)	Soil / fresh water	Seawater	Design life
$\Phi 16 \times 500$	2.5 A	15 A	20 years
$\Phi 16 \times 1000$	5 A	30 A	20 years
$\Phi 19 \times 500$	3 A	15 A	20 years
$\Phi 19 \times 1000$	6 A	32.5 A	20 years
$\Phi 25 \times 500$	4 A	23.5 A	20 years
$\Phi 25 \times 1000$	8 A	47 A	20 years
$\Phi 32 \times 500$	5 A	30 A	20 years
$\Phi 32 \times 1000$	10 A	60 A	20 years

The ratings correspond to an anode current density of about 100 A/m² in soil and fresh water and up to 600 A/m² in seawater. They are typical design values: other sizes, longer design lives and ratings for a specific electrolyte are calculated per project.

Configurations

- **Single anodes:** bare coated tubes for installation by the contractor.
- **Anode with cable:** each tube factory-connected to its lead cable.
- **Anode strings:** several tubes connected along one cable, for deep-well and vertical groundbeds.

Common cable insulation systems are XLPE/PVC and PVDF/HMWPE; cable type, cross-section and length are made to order.

The lead cable is connected inside the tube with a copper wedge connector.

Coating

The tube carries an iridium-based mixed metal oxide coating. Ruthenium-iridium (Ru-Ir) systems are used where chlorine is evolved, as in seawater and brine; iridium-tantalum (Ir-Ta) systems where oxygen is evolved, as in low-chloride soil and fresh water. The coating system is confirmed per order against the electrolyte.

Inspection

Every batch is shipped with an outgoing inspection report that records measured values. It covers:

Check	Acceptance
Tube material	Chemical composition conforms to ASTM B338 Grade 1 (or Grade 2 as ordered)
Dimensions	Diameter, wall and length as ordered; outer surface fully coated
Coating thickness (X-ray)	≥ 4 μm
Bend test, 180° around a Φ12 mm mandrel	No coating peeling at the bend
Tape test	No visible black residue on the tape
Appearance	No stains or contamination; per tube fewer than two scratches, each under 10 mm long and 2 mm wide, and fewer than two scuffs, each under 5 mm ² ; no exposed substrate

Packing

Anodes are packed in wooden crates on foam liners, with each string's cable coiled and labelled by well or position number.

Samples, Shipping and Response

- **Samples:** 1–2 sample anodes can be supplied for evaluation before you order.
- **Shipping:** anodes have been shipped to Malaysia and Dubai (UAE). We quote FOB, CIF or DDP; for DDP we handle import customs clearance.
- **Response:** every enquiry receives a reply within 24 hours.

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Current version online: <https://titaniumseller.com/products/titanium-anodes-and-electrodes/mmo-tubular-anode/>