



CORROSION CONTROL

Technical Datasheet

MMO TUBULAR ANODES

A high performance anode specifically designed for harsh environments and areas where conventional installations and replacements would be economically prohibitive.

The mixed metal oxide coating is a crystalline electrically conductive coating that activates and enables a titanium substrate to function as an anode. The coating consists of IrO₂/Ta₂O₅ and is suitable for use in soils, carbonaceous backfill, fresh and brackish water, seawater and concrete.

Whether operating in fresh water, seawater, soil or mud MMO coatings are extremely stable even in very low pH environments.



Standard Anodes Sizes

MMO anodes are available in two standard sizes - however other sizes are available on request:

| Diameter | Length | Surface Area | Assembled Weight |
|----------|---------|----------------------|------------------|
| 25 mm | 1000 mm | 0.079 m ² | 1.10 kg |
| 25 mm | 500 mm | 0.039 m ² | 0.56 kg |

Current Output of Standard Anodes:

| Environment | Maximum Current Density | Lifetime* |
|-----------------------------|--------------------------|-----------|
| Carbonaceous Backfill | 50 A/m ² | 20 years |
| Calcined Petroleum Backfill | 100 A/m ² | 20 years |
| Fresh Water | 100 A/m ² | 20 years |
| Brackish Water | 100-300 A/m ² | 20 years |
| Sea Water | 600 A/m ² | 20 years |

* Lifetime is dependent upon running at full output for the length of time. So in carbonaceous backfill the maximum current density is 50 A/m² which will give 20 years lifetime. If the anodes are operated at 25 A/m² then the lifetime will increase to 40 years.



CORROSION CONTROL

Technical Datasheet

| Environment | Current Output of 1000 mm Anode | Current Output of 500 mm Anode |
|-----------------------------|---------------------------------|--------------------------------|
| Coke breeze / fresh water | 8 A | 4 A |
| Seawater | 50 A | 25 A |
| Saline mud / brackish water | 8 A | 4 A |

Data based on temperature range:

- Soil/Coke Breeze/fresh water: 5°C - 50°C 20 year life
- Seawater 10°C - 50°C 15 year life
- Mud/Brackish Water 5°C - 50°C 20 year life

Centre Cable Crimp Connection

BAC has developed an extremely strong and electrically low resistance centre crimp connection, which ensures the lowest possible electrical resistance between the cable and anode substrate. In strength tests the cable will always break first without any effect on the crimp connection.



Typical anode to cable insert strength (Tensile)

- 2.5cm Diameter: 1200kg
- 1.9cm Diameter: 1200kg
- 1.6cm Diameter: 1200kg

Components

All MMO anodes use PVDF sealing bungs and sleeving to ensure maximum protection in the most hostile of environments. As a further safe guard the centre connection is sealed with an extremely high performance 2 pack epoxy resin.

Standards, Testing and Inspection

Titanium tubes to ASTM B336. MMO anodes have a substrate with Ti to ASTM grade 1 or 2.

Anode centre connection to cable resistance tests completed for each anode string.

Each anode assembly is rigorously tested and inspected from design to packaging. All phases of material selection, MMO coating, testing and assembly are scrutinized under BAC ISO 9001 procedures.