

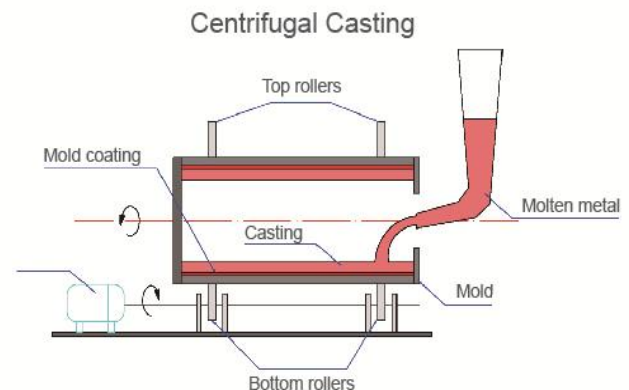
HSCI Tubular Anodes (TA Series)

Jennings Anodes has been a leading supplier of High Silicon Cast Iron for over 40 years. We manufacture our Anodes in the UK (Jennings Foundry) with a combined production capacity of 3000T per year. (Jennings Foundry previously manufactured all the Durichlor-51 Anodes.)

Our depth of knowledge and experience enables us to provide a comprehensive range of HSCI anodes in Tubular form to the highest of standards, meeting X-Ray Level 1 as per ASTM E186/E446, Chemistry to either ASTM A518-99 Gr 1 or 3.

Production Process (Centrifugal Casting)

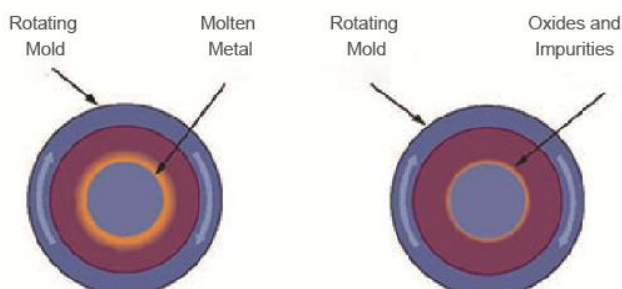
Jennings Anodes Tubular HSCI anodes are manufactured using a Centrifugal Chill Cast Method. No other method consistently produces tubular anodes with a superior metallic structure than this proven route.



PRODUCT FEATURES

1. CASTING INTEGRITY ACHIEVED THROUGH ONE DIRECTIONAL SOLIDIFICATION

Centrifugal Castings are cast using a spinning mold rotating at over a 1000 RPM, on cooling centrifugal castings only cool from the outside diameter to the inside diameter. This ensures the walls of the casting are denser and purer than other casting methods. The anode therefore is made up from a dense, homogenous metal matrix, with no gas inclusions, no porosity and no shrinkage.



2. IMPACT RESISTANCE

The centrifugal casting in a chill or steel mold ensures greater density and integrity resulting in a stronger anode with improved impact resistance helping to avoid anode breakage during handling and installation.



3. A LOW CONSUMPTION RATE

A stippled effect outer surface leads to a large surface area in comparison to anode weight thus reducing the anode current density, giving 30% more amp-years than conventional stick anodes.

5. LOW CABLE CONNECTOR RESISTANCE

A low resistivity (Less than 0.001 Ohms) Zinc Wedge-lock center connection ensures a balanced spread of current throughout the length of the anode, extending the life of the anode and resulting in a reliable current discharge to the surrounding environment.

The connection is resin encapsulated using a high-quality Epoxy Resin to ensure eradication of moisture ingress.

APPLICATIONS

High silicon cast iron anodes are used for a variety of impressed current cathodic protection (ICCP) applications including:

- Deep well systems
- Shallow installations
- Grounding cells
- Offshore structure systems
- Vertical and Horizontal well
- Long Distance transmission pipelines

4. LONGER LIFE EXPECTANCY

Excellent performance proven by 3rd Party Accelerated Corrosion Testing. (Presentation NACE 2018 Mr C.D. Jennings - MSL Report). Appendix Ref 1.

6. EASE OF CONNECTION

A unique cable connection device can be provided for easy and efficient installation, (200 pcs can be connected by 2 people in less than 8 Hours)



CHEMICAL COMPOSITION

Element	ASTM A518 / A518M		BS 1591 1975
	Grade 1 (Si-Fe)	Grade 3 (Si-Fe-Cr)	
Carbon	0.65~1.10%	0.70~1.10%	1.40% Max.
Manganese	1.50% Max.	1.50% Max.	0.50% Max.
Silicon	14.20~14.75%	14.20~14.75%	14.25~15.25%
Chromium	0.50% Max.	3.25~5.00%	0.50% Max.
Molybdenum	0.50% Max.	0.20% Max.	/
Copper	0.50% Max.	0.50% Max.	/
Sulphur	/	/	0.10% Max.
Phosphorus	/	/	0.25% Max.
Iron	Remainder	Remainder	Remainder

ELECTROCHEMICAL PROPERTIES

Element	ASTM A518 / A518M Grade 1 (Si-Fe)	ASTM A518 / A518M Grade 3 (Si-Fe-Cr)	BS 1591 1975
Soil / Fresh Water	2.0- 5.0 A/m ²	0.1 - 0.5 kg/ A-y	<p>Avoid: Dry Soils High pH Value High Sulfate</p> <p>Consider during design: Brittle Chrome Alloy Chloride Environment</p>
	0.2 - 0.5 A/ft ²	0.2-1.2 lbs/A-y	
Carbon Backfill	5.0 - 10 A/m ²	0.05 - 0.3 kg/ A-y	
	0.5 - 1.0A/ft ²	0.1- 0.7 lbs/A-y	
Seawater	10 - 50 A/m ²	0.3 - 0.5 kg/ A-y	
	1.0 - 5.0 A/ft ²	0.7 -1.0 lbs/A-y	

PRODUCT SPECIFICATION - TA SERIES

Anode Model	Anode Weight	Diameter	Overall Length	Surface Area
JA - 60 - TA2S	32.80lbs (14.90kg)	Φ2.28" (58mm)	60" (1524mm)	3.0sq.ft. (0.28m ²)
JA - 60 - TA3S	44.90lbs (20.40kg)	Φ2.80" (71mm)		3.6sq.ft. (0.34m ²)
JA - 60 - TA4S	61.70lbs (28.00kg)	Φ3.80" (97mm)		5.0sq.ft. (0.46m ²)
JA - 60 - TA5AS	124.90lbs (56.70kg)	Φ4.80" (122mm)		6.3sq.ft. (0.59m ²)

Anode Model	Anode Weight	Diameter	Overall Length	Surface Area
JA - 84 - TA2	46.30lbs (20.90kg)	Φ2.28" (58mm)	84" (2133mm)	4.2sq.ft. (0.39m ²)
JA - 84 - TA3	63.05lbs (28.60kg)	Φ2.80" (71mm)		5.1sq.ft. (0.48m ²)
JA - 84 - TA4	86.00lbs (39.20kg)	Φ3.80" (97mm)		6.9sq.ft. (0.64m ²)
JA - 84 - TA5A	175.00lbs (79.50kg)	Φ4.80" (122mm)		8.8sq.ft. (0.82m ²)

- All weights and dimensions are nominal and subject to variation in material compositions and our foundry tolerance.
- Above standard sizes are available at Jennings Anodes warehouse. Other configurations are available upon request.

Anode Configuration

Jennings Anodes TA Anodes can be supplied bare, with a specified cable center connected. Cable can be either in a single length or tubular anodes can be connected in a string formation. Anode can also be supplied cable connected and pre-packed in galvanized steel canisters.

Ordering Information

- Anode Model
- Anode Configuration
- Quantity
- Delivery Address (Estimated Shipping Cost)

QUALITY ASSURANCE & TESTING

Quality Assurance and Quality Control procedures are employed and strictly implemented to guarantee the performance of the anodes. Chemical integrity is ensured by pre and post castings sampling. All Anodes are individually stamped for full traceability and identification. Full test reports are enclosed with the customer's shipping documents.

Testing	Chemical Composition	Physical Appearance
Standards & Methods	ISO 9001 Quality Management System and Foundry Internal Standards for HSCI Tubular Anodes	
	ASTM E350	ASTM E350
Items	Chemical Analysis	Anode Surface, Finish and Appearance (oxide slag, internal shrinkage, gas porosity, crack, non-metallic inclusions), Size, Weight; Pulling Tension of cable connection, Epoxy Resin Sealing, Cable Type and length, Resistance (Cable and Anode), Drop Impact test etc. Transverse Bend Test are available upon request.
Equipment & Devices	Optical Emission Spectrometer Labspark 750A, Thermoscientific Niton XL2-980	Visual Inspection, Calipers, Tap Measure, Scale, Tensile Tester etc

PACKING

Jennings Anodes has strict packing standards to guarantee delivery. Clear shipping marks make it easier for acceptance of the order.



Anode Model	Unit	Packing Details				
		Nos. of Anodes per Crate/Pallet	Crate/Pallet Dimension	Net Weight	Gross Weight	Nos. of Crates per 20ft. Container
JA - 60 - TA2S	EA	63	63" x 26" x 27.5" (1600 x 650 x 700mm)	2072lbs (945kg)	2194lbs (1005kg)	21
JA - 60 - TA3S		48	63" x 27" x 27.5" (1600 x 690 x 700mm)	2161lbs (985kg)	2304lbs (1050kg)	20
JA - 48 - SA4S		36	63" x 27" x 33" (1600 x 690 x 850mm)	2227lbs (1008kg)	2370lbs (1075kg)	20
JA - 60 - TA5AS		16	63" x 24" x 29"(1600 x 600 x 730mm)	2006lbs (910kg)	2127lbs (965kg)	22

Anode Model	Unit	Packing Details				
		Nos. of Anodes per Crate/Pallet	Crate/Pallet Dimension	Net Weight	Gross Weight	Nos. of Crates per 20ft. Container
JA - 84 - TA2	EA	63	87" x 26" x 27.5"(2210 x 650 x 700mm)	2910lbs (1323kg)	3075lbs (1395kg)	15
JA - 84 - TA3		48	87" x 27" x 27.5"(2210 x 690 x 700mm)	3031lbs (1390kg)	3197lbs (1465kg)	15
JA - 84 - TA4		34	87" x 27" x 33"(2210 x 690 x 850mm)	2954lbs (1340kg)	3120lbs (1415kg)	15
JA - 84 - TA5A		25	87" x 24" x 29"(2210 x 720 x 870mm)	2822lbs (1250kg)	2998lbs (1330kg)	16

• Custom packing is available upon request.

Shipping Documents

- Proforma Invoice
- Packing List
- Testing Reports
(Chemical Composition, Electrochemical Properties Test, Certificate of Compliance)
- Others upon request (Certificate of Origin etc.)