

**Silicon Iron anodes (Fe/Si) (Fe/Si/CR) (Fe/Si/Mo)**

High Silicon Cast Iron anodes supplied with chemical compositions according to ASTM A518 or BS 1591.

**Applications**

High Silicon Cast Iron anodes are widely used in underground applications in shallow groundbeds. Their performance can be improved with coke breeze backfill.

Standard type Fe/Si-anode for use in neutral soil and freshwater environments.

Fe/Si/Cr and Fe/Si/Mo-anodes for use in aggressive acidic or alkaline soil and seawater environments.

Effectiveness of cast iron`s performance as an anode depends upon the formation of a thin layer silicon oxide on its surface. This protective film is formed by oxidation.

Silicon-chromium cast iron is highly resistant to acid solutions but has a better performance in alkaline environments or in the presence of sulphate ions.

**Fabrication**

Each cast iron anode is normally provided with an individual cable of varying length. Cast iron anodes are provided in both end-connected and centre-connected configurations.

Following the anode-to-cable connection, the annular space around the cable is filled with a high quality electrical sealant. Heat shrinkable anode caps are commonly used for additional protection. Cast iron anodes can be prepacked in steel canisters with carbonaceous backfill.

**Chemical Compositions of Fe/Si/Cr-Anodes**

Standard	ASTM A518 Gr3		BS 1591 SiCr 14 4	
	Minimum	Maximum	Minimum	Maximum
Silicon	14.20 %	14.75 %	14.25 %	15.25 %
Chromium	3.25 %	5.00 %	4.00 %	5.00 %
Carbon	0.70 %	1.10 %		1.40 %
Manganese		1.50 %		1.00 %
Molybdenum		0.20 %		
Copper		0.50 %		
Phosphorus				0.25 %
Sulphur				0.10 %



**Characteristics**

Tensile strength	103	N/mm <sup>2</sup>
Compressive strength	689	N/mm <sup>2</sup>
Brinell hardness	520	HB
Density	7.0	g/cm <sup>3</sup>
Melting point	1300	°C
Coefficient of linear expansion	1.86 x 10 <sup>-5</sup>	1/°C (0-100°C)

Environment	Current Density A/m <sup>2</sup>	Consumption Rate kg/A year	Efficiency %
Freshwater	10 - 30	0.15	90
Saltwater	10 - 50	0.50	90
Soil	10 - 30	0.30	90

**The following cable types are available as anode lead cables:**

PVC	Polyvinylchloride
PE	Polyethylene
XLPE	Cross linked Polyethylene
HDPE	High density Polyethylene
CSP	Chlorosulphonated Polyethylene
EPR	Ethylene Propylene Rubber
PVDF	Polyvinylidenfluoride

Armoured cables are also available on request.

All weights and dimensions are nominal and subject to variation in material compositions.

## IMPRESSED CURRENT ANODES

### Silicon iron anodes

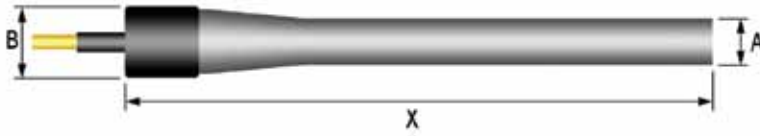
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German Cathodic Protection

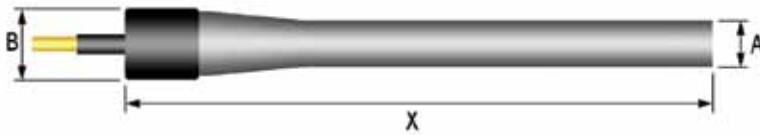


#### TYPE: 915



Total length -X-	915 mm	915 mm	915 mm	915 mm	915 mm
Diameter -A-	25 mm	38 mm	50 mm	63 mm	76 mm
Diameter -B-	50 mm	63 mm	76 mm	89 mm	101 mm
Surface area	0.08 m <sup>2</sup>	0.12 m <sup>2</sup>	0.16 m <sup>2</sup>	0.20 m <sup>2</sup>	0.23 m <sup>2</sup>
Total weight	3.2 kg	7.1 kg	14.5 kg	21.0 kg	31.4 kg

#### TYPE: 1220



Total length -X-	1220 mm	1220 mm	1220 mm	1220 mm	1220 mm
Diameter -A-	25 mm	38 mm	50 mm	63 mm	76 mm
Diameter -B-	50 mm	63 mm	76 mm	89 mm	101 mm
Surface area	0.11 m <sup>2</sup>	0.16 m <sup>2</sup>	0.20 m <sup>2</sup>	0.25 m <sup>2</sup>	0.30 m <sup>2</sup>
Total weight	4.5 kg	10.0 kg	19.0 kg	28.6 kg	38.2 kg

#### Tubular Anodes

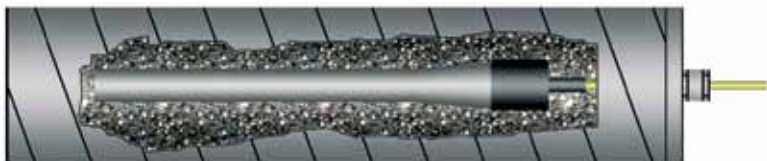


Silicon iron tubular anodes with a specially designed low resistance centre connection.

Total length	1067 mm	2134 mm	2134 mm	2134 mm	2134 mm
Diameter (outside)	68.0 mm	56.0 mm	68.0 mm	96.0 mm	122.0 mm
Diameter (inside)	45.7 mm	38.0 mm	45.7 mm	73.7 mm	99.0 mm
Approx. area	0.2 m <sup>2</sup>	0.4 m <sup>2</sup>	0.5 m <sup>2</sup>	0.6 m <sup>2</sup>	0.8 m <sup>2</sup>
Total weight	14.1 kg	20.9 kg	28.6 kg	38.6 kg	59.9 kg

All weights and dimensions are nominal and subject to variation in material compositions.

#### CANISTER FOR TYPE: 915 + TYPE: 1220



#### COKE BACKFILL

Minimum carbon content	90	%
Maximum moisture content	5	%
Maximum resistivity	1	Ωm
Density	700-950	kg/m <sup>3</sup>
Maximum particle size (dia.)	20	mm

Standard canister	Diameter	Length	Total weight
CAN 10	160 mm	1000 mm	22 kg
CAN 15	300 mm	1500 mm	85 kg
CAN 20	300 mm	2000 mm	110 kg