



KORTEK

Corrosion Technologies Co. Ltd.

Magnesium anodes are commonly used in Cathodic Protection, as Mg metal has more negative potential than the other galvanic materials.

In order to ensure high quality of the magnesium anode, high purity of magnesium ingot is using with advanced casting technology and chemical analysis and potential tests are performed on every heat.

APPLICATION

- Temporary protection of buried pipelines
- Protection of well coated buried pipelines
- Internal protection of water tanks
- Protection of small marine structures
- "Hot spot" locations for buried & submerged steel structures
- Magnesium anode is suitable to be used in soil, mud, fresh water, brackish water and sea water.



GALVANIC CATHODIC PROTECTION

ALLOY COMPOSITION

	Standard	High Potential
Aluminum	5.30-6.70%	0.01% max
Zinc	2.50-3.50%	-
Manganese	0.15-0.70%	0.50-1.30%
Silicon	0.10% max	0.05% max
Copper	0.02% max	0.02% max
Nickel	0.002% max	0.001% max
Iron	0.003% max	0.03% max
Other Impurities	-	0.05% max
Total	0.30% max	0.30% max
Magnesium	Balance	Balance

ELECTROCHEMICAL PROPERTIES

	Standard	High Potential
Open Circuit Potential wrt Cu/CuSO ₄	1.57 - 1.60 Volts	1.77 - 1.82 Volts
Closed Circuit Potential wrt Cu/CuSO ₄	1.52 - 1.57 Volts	1.64 - 1.69 Volts
Output Capacity	1200 A.h/kg	1100 A.h/kg
Current Efficiency	50%	50%

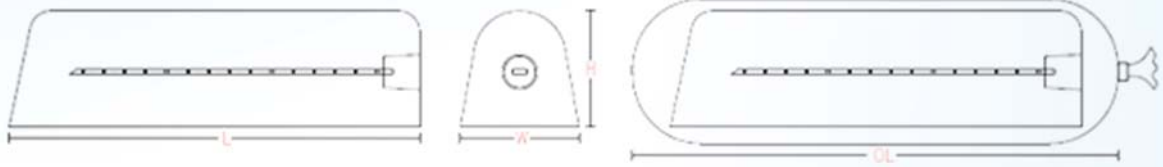
MAGNESIUM ANODES



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GALVANIC CATHODIC PROTECTION

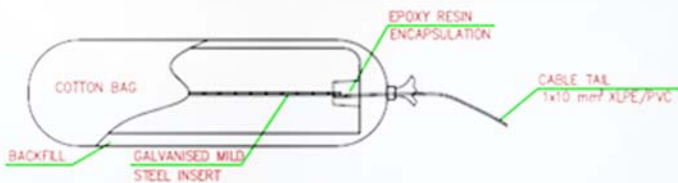
ANODE DIMENSIONS D TYPE



TYPE	Weight (Nominal)				Anode Dimensions							
	Bare		Packaged		A (Width)		B (Height)		C (Length)		Overall Length (OL)	
	lbs	kg	lbs	kg	in	mm	in	mm	in	mm	in	mm
3D2	3	1,4	8	3,6	3,5	89	3,75	95	5	127	10	25,4
5D2	5	2,3	17	7,7	3,5	89	3,75	95	8,5	216	12	305
6D2	6	2,7	19	8,6	2,75	70	3	76	21,5	547	26	660
14D2	14	6,4	46	20,9	2,75	70	3	76	33,5	850	38	965
20D2	20	9,1	70	31,8	2,75	70	3	76	49,5	1260	55	1397
17D3*	17	7,7	45	20,4	3,5	89	3,75	95	26	657	34	864
32D3*	32	14,5	91	41,3	5,5	139	5,75	146	20,5	523	25	635
48D3	48	21,8	100	45,4	5,5	139	5,75	146	30	765	35	889
60D3	60	27,2	125	56,8	4,5	114	4,5	114	60	1520	64	1626

* KORTEK standard stock

Other sizes can be manufactured to suit customer requirements.



The bare Mg anode is assembled with cable, sealed with epoxy resin and packaged in a cotton bag.

Composition of Backfill

- Gypsum 75%
- Bentonite 20%
- Sodium Sulphate 5%

Environmental Safety

As the prepackaged anodes buried to the ground, the harmful elements may leak to the soil and groundwater when anodes are in use. This situation causes the pollution of environment.

KORTEK prepackaged anodes are made of recyclable materials or easily decomposable materials and the content of remaining harmful elements are lower than the safety standards which will not bring any pollution to the surrounding.

Harmful Elements in Backfill

Cd (max)	As (max)	Hg (max)	Pb (max)
1 ppm	1 ppm	1 ppm	10 ppm



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We supply series of aluminum anodes for defend the corrosion of steel structures in seawater. The performance of anode is affected by the chemical composition of the alloy. We adopt high purity of aluminum ingot for the anodes. The anodes are casted automatically, thus the anode alloy is uniform, free of dust and oxides.

APPLICATION

- Protection of underwater routed pipelines
- "Hot spot" locations for submerged steel structures

Please contact us for advice on optimizing an anode to suit your specific requirements.

ELECTROCHEMICAL PROPERTIES

Type	Open Voltage (-V)	Closed Voltage (-V)	Capacity A.h/kg	Efficiency
Al-Zn-In-Si	1,05-1,18	1,05-1,12	2500 min	90% min
Al-Zn-In-Ti	1,05-1,18	1,05-1,12	2500 min	90% min
Al-Zn-In-Mg-Ti	1,10-1,18	1,05-1,12	2600 min	92% min



ALLOY SPECIFICATIONS

Type	Zn %	In %	Si %	Fe %	Mn %	Cu %	Ti %	Mg %	Al %
AL-Zn-In-Si	2,8-3,5	0,01-0,02	0,08-0,2	0,1 max	0,1 max	0,005 max	-	-	Balance
AL-Zn-In-Ti	2,0-5,0	0,015-0,05	0,01 max	0,1 max	0,1 max	0,005 max	0,01-0,05	-	Balance
AL-Zn-In-Mg-Ti	4,0-7,0	0,02-0,05	0,1 max	0,15 max	-	0,01 max	0,01-0,08	0,5-1,5	Balance





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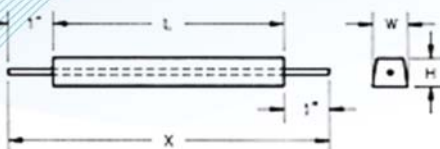
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ALUMINUM PLATFORM & JETTY ANODES

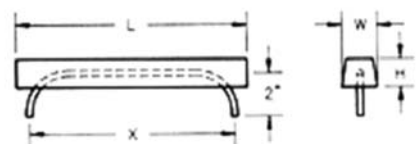
Type	Weigth (Nominal)		Anode Dimensions							
			Length (L)		Up Width		Bottom Width		Height (H)	
	lbs	kg	in	mm	in	mm	in	mm	in	mm
AL-S01	606,27	275	90,5	2300	8,50	220	9,50	240	9	230
AL-S02	363,76	165	63	1600	8,50	220	8,25	210	8,50	220
AL-S03	317,47	144	59	1500	6,75	170	8	200	7	180
AL-S04	176,37	80	31,5	800	8	200	11	280	6	150
AL-S05	123,46	56	49,25	1250	4,50	115	5,25	135	5	130
AL-S06	116,84	53	35,50	900	6	150	6,75	170	6,25	160
AL-S07	99,208	45	39,50	1000	4,50	115	5,25	135	5	130
AL-S08	74,957	34	29,50	750	4,50	115	5,25	135	5	130

Please specify the length between supports (X) and core type.

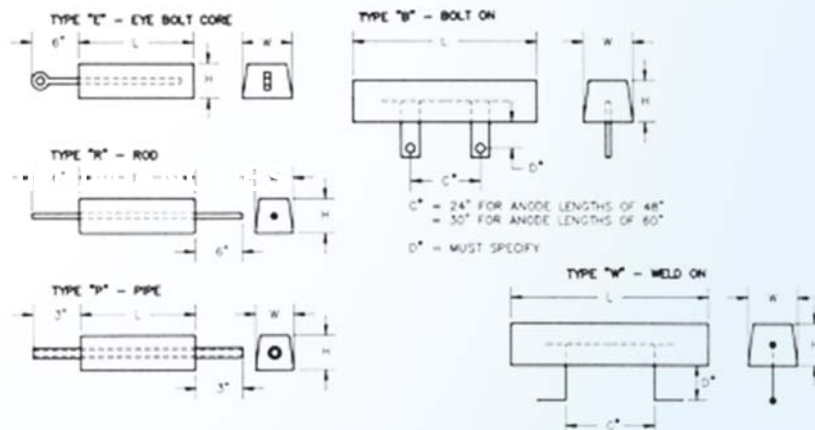
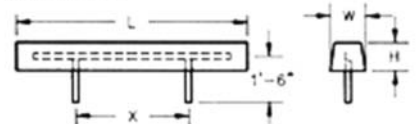
CORE TYPE A



CORE TYPE B



CORE TYPE C



ALUMINUM TANK ANODES

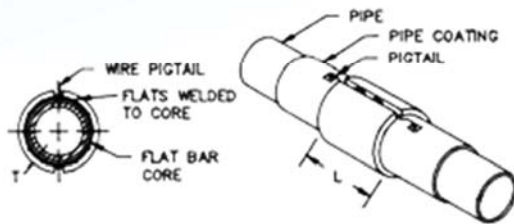
Type	Weigth (Nominal)		Anode Dimensions							
			Length (L)		Up Width		Bottom Width		Height (H)	
	lbs	kg	in	mm	in	mm	in	mm	in	mm
AL-T01	47,40	21,50	59	1500	2,50	65	3	75	2,75	70
AL-T02	50,71	23	19,75	500	4,50	115	5,25	135	5	130
AL-T03	44,09	20	19,75	500	4,25	110	5	130	4,75	120
AL-T04	29,10	13,20	4	100	2,25	58	3	78,50	2,75	68
AL-T05	22,05	10	31,50	800	2,25	56	3	74	2,50	65

Please specify the length between supports (C) and core type.

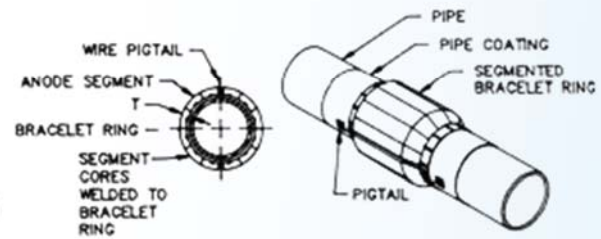


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SEMI-CYLINDRICAL (SQUARE)



MULTI-SEGMENTED (TAPERED)



ALUMINUM BRACELET ANODES

Type	Weight (Nominal)		Anode Dimensions							
			Diameter		Thickness (T)		Length (L)		Pipe Diameter	
	lbs	kg	in	mm	in	mm	in	mm	in	mm
AL-B20	231,49	105	20,25	516	2	51	20	505	20	508
AL-B16	198,42	90	16,25	414	3	76	14,50	370	16	406
AL-B14	169,76	77	14,25	364	3	76	14,50	370	14	356
AL-B12	149,91	68	12,25	313	2	51	21,75	550	12	305
AL-B10	119,05	54	10,25	262	2	51	20,50	520	10	254
AL-B08	92,59	42	8,25	211	2	51	19,75	500	8	203
AL-B06	59,52	27	6,25	161	2	51	16,75	425	6	152

Please specify the type of bracelet anode required.



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Zinc is one of cathodic protection anode metal due to relatively high potential in galvanic series and longest serving anode material. It has number of closely related applications all of which can be served by KORTEK high quality products.

APPLICATION

- To avoid bi-metallic corrosion of associated structures.
- To mitigate voltages introduced in pipelines by adjacent overhead AC power lines.
- Corrosion control of underground metallic structures.

In grounding earthing application of zinc anodes, packaged anode where the anode has a high length to weight ratio in order to minimise its ohmic resistance to ground.

ELECTROCHEMICAL PROPERTIES

Potential wrt Cu/CuSO ₄	1.10 Volts
Output Capacity	780 A.hour/kg
Current Efficiency	95%
Consumption	11.2 kg/A.year

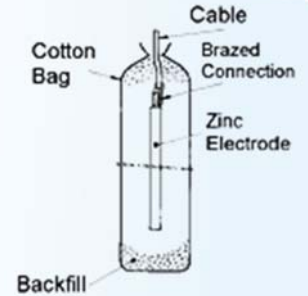
ALLOY COMPOSITION

	Standard
Aluminum	0.15 - 0.30%
Cadmium	0.04 - 0.06%
Iron	0.002% max
Tin	0.001% max
Copper	0.001% max
Lead	0.004% max
Silicon	0.10% max
Zinc	Remainder

The zinc used in KORTEK anodes is within the specification laid down by US Mil-A-18001H.

ZINC EARTHING ELECTRODE-SINGLE

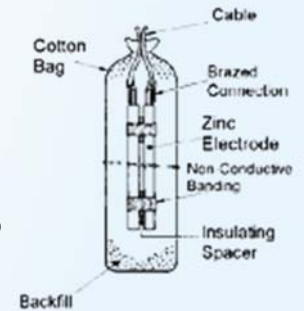
Standard Zinc casting and package dimensions are represented below. Other than the standard casting can be supplied upon request.



Size Bare	1 No. 35x35x1525 mm
Size Packaged	120 mm Dia x 1700 mm Length
Cable	1 x 25 mm ² XLPE/PVC
Weight	35 kgs (77 lbs)

ZINC EARTHING ELECTRODE-DOUBLE

These are similar in design to the single electrode except there are two zinc anodes which are insulated from each other. Generally, one anode rod would be connected to the structure to be protected, and the other to an earthing device. The rods are surrounded by a low resistivity backfill which allows any large stray currents to pass between the electrodes. This has the benefit of earthing a structure to ground without providing a direct connection.



Size Bare	2 No. 35x35x1525 mm
Size Packaged	165 mm Dia x 1700 mm Length
Cable	1 x 25 mm ² XLPE/PVC
Weight	70 kgs (154 lbs)

Other anode types are manufactured according to requirements or specifications.



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GALVANIC CATHODIC PROTECTION

TYPICAL USES

- External areas of steel pipe, especially in difficult environments such as below grade in rocky and mountainous terrain, thawed zones in permafrost, etc.
- Interior bottom areas of oil storage tanks where salt water settles out.
- Exterior bottoms of oil storage tanks.
- Interstitial spaces between old, corroded and new storage tank bottoms.
- In the limited space between inner and outer casings of wells of various kinds.
- For grounding steel tower footings of overhead power systems.
- To provide cathodic protection as well as to dissipate induced A.C. current on coated steel pipe.
- For personnel safety, as well as corrosion protection. To ground valves and test stations of pipe lines which are subject to induced A.C. current and fault currents.



APPLICATION

Zinc ribbon anodes provide a very simple, cost effective, maintenance free method of corrosion control for buried or immersed metals such as iron, steel, aluminum, copper, etc. It is especially useful for unattended applications; those where other cathodic protection systems requiring monitoring and/or frequent maintenance cannot be possible.

It can also be used as a temporary system prior to the installation of an impressed current system and as a method of providing AC mitigation.

Chemical Composition

	AL %	Cd %	Fe %	Pb %	Cu %	Zn %
ASTM B-418 type I	0.1 - 0.5	0.02-0.07	0.005 max	0.006 max	0.006 max	Balance
ASTM B-418 type II	0.005 max	0.003 max	0.0014 max	0.003 max	0.002 max	Balance

Electrochemical Properties

	Open Voltage(-V)	Closed Voltage (-V)	Capacity A.h/kg	Efficiency % min
ASTM B-418 type I	1.05min	1.00min	780	95%
ASTM B-418 type II	1.10 min	1.05 min	780	90%

Type	A (inch)(mm)	B (inch)(mm)	net weight(lbs/feet)(kg/m)	Core (inch)(mm)	AxB
YX-YZR-01	1(25,4)	1-1/4(31.75)	2.4(3.57)	0.185(4.70)	
YX-YZR-02	5/8(15.88)	7/8(22.22)	1.2(1.785)	0.135(3.43)	
YX-YZR-03	1/2(12,7)	9/16(14.28)	0.6(0.893)	0.130(3.30)	
YX-YZR-04	11/32(8.73)	13/32(10.32)	0.25(0.372)	0.115(2.92)	
Packing	Open coil in wooden case or pallet				



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DESCRIPTION

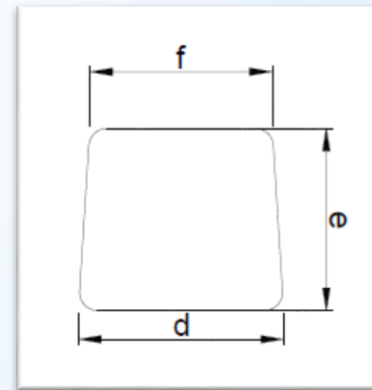
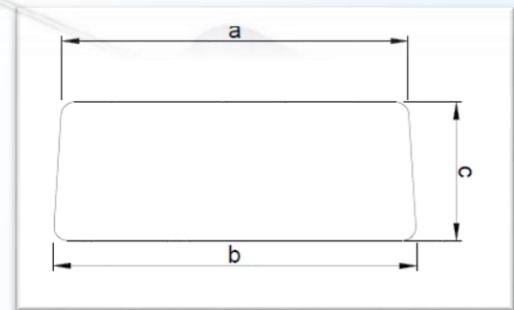
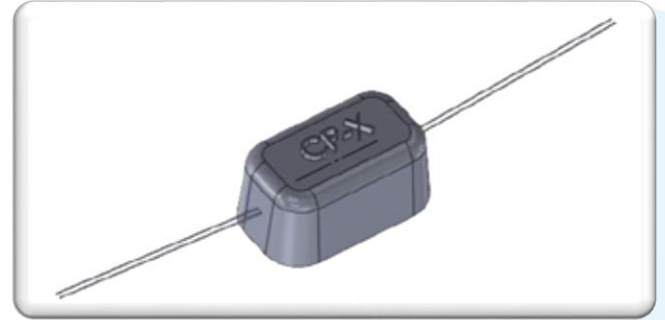
Zinc anodes are widely adopted for cathodic protection of steel in concrete in corrosive environment.

SPECIFICATION

The chemical composition and electrochemical properties of the anode are covered by the ASTM-B418 Type-I. The anode is covered by a specially formulated high alkaline porous cementitious mortar.

APPLICATION

- The anode is tied to the surrounding reinforcement bars through its galvanized wires.
- The anodes are uniformly distributed based on the steel surface area.
- The anode performance and service life depends on many factors which are concrete conductivity, steel density, spacing of the anodes, concrete cover thickness, humidity, whether the anodes are used for corrosion prevention (existing structure repair) or corrosion control (new structure), pH of the concrete, temperature etc...



ZINC ANODE DIMENSIONS

a, mm	b, mm	c, mm	d, mm	e, mm	f, mm
100	105	40	50	40	40
Zinc Anode Weight				160 gr	
<i>Galvanised connection wires total length is 50 cm. (18 ~ 20 cm each side of anodes)</i>					