



Aluminum Anodes

Aluminum anode is primarily used to prevent corrosion of steel structures in seawater and brackish water environments.

As a popular choice of anode, it has a lower weight but maintains a much higher capacity than zinc, and a slower corrosion level than magnesium.

It is widely used for the cathodic protection of marine infrastructure, wharfs piers, harbour facilities, offshore platforms, and subsea pipelines.

- Flush-Mounted Aluminum Anodes
- Satnd-Off Aluminum Anodes
- Aluminum Anode Sled
- Aluminum Bracelet Anodes
- Aluminum Heat Treater Anodes



Casted in low-iron, high-purity alloys, our indium-activated anode is manufactured as per the standard of ISO, NACE, DNV. By conforming to ISO 9001:2015 standards, our aluminum anode is inspected and tested in accordance with stringent procedures to ensure high quality.

We offer a comprehensive selection of aluminum anodes in various sizes, weights and core configurations. Conventionally, our annual production capacity is up to 5,000 tons.

CHEMICAL COMPOSITION

Standard Element	GALVALUM III	DNV-RP-B401-2011	GS EP COR 201
Zinc (Zn)	2.0% ~ 6.0%	2.5% ~ 5.75%	4.75% ~ 5.75%
Indium (In)	0.01% ~ 0.02%	0.015% ~ 0.04%	0.015% ~ 0.02%
Silicon (Si)	0.08% ~ 0.2%	0.12% max.	0.06% ~ 0.12%
Iron (Fe)	0.13% max.	0.09% max.	0.12% max.
Copper (Cu)	0.006% max.	0.003% max.	0.003% max.
Cadmium (Cd)	—	0.002% max.	0.002% max.
Total Impurities	0.1% max.	0.1% max.	0.1% max.
Aluminum (Al)	Remainder	Remainder	Remainder

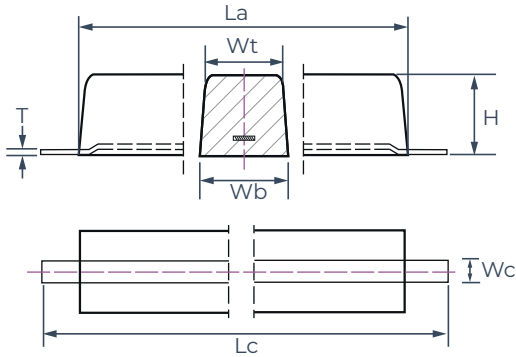
ELECTROCHEMICAL PROPERTIES

Technical Measurement	Performance
Open Circuit Voltage (-V)	1.10 min.
Closed Circuit Voltage (-V)	1.05 min.
Current Capacity	1135 A.h/lbs (2500 A.h/kg)
Current Efficiency	90% min.
Consumption Rate	7.6 lbs/A.y (3.4 kg/A.y)

* The open/closed circuit voltage is with respect to a Ag/AgCl reference electrode.



Flush-Mounted Aluminum Anodes



Anode with Steel Flat Bar Insert

Item No.	Anode Dimensions				Insert Dimensions		Weight	
	Wt	Wb	H	La	Wc x T	Lc	N.W	G.W
JA-AL-FB01	5.8" (148 mm)	7.0" (178 mm)	6.7" (170 mm)	59.1" (1500 mm)	2.0"x0.3" (50x8 mm)	70.9" (1800 mm)	242.5 lbs (110 kg)	257.5 lbs (116.8 kg)
JA-AL-FB02	7.1" (180 mm)	8.7" (220 mm)	7.1" (180 mm)	33.5" (850 mm)	2.4"x0.3" (60x8 mm)	43.3" (1100 mm)	179.7 lbs (81.5 kg)	188.5 lbs (85.5 kg)
JA-AL-FB03	7.9" (200 mm)	11.0" (280 mm)	5.9" (150 mm)	31.5" (800 mm)	2.4"x0.3" (60x8 mm)	41.3" (1050 mm)	168.7 lbs (76.5 kg)	177.5 lbs (80.5 kg)
JA-AL-FB04	6.3" (160 mm)	8.7" (220 mm)	7.1" (180 mm)	27.6" (700 mm)	2.4"x0.3" (60x8 mm)	37.4" (950 mm)	140.9 lbs (63.9 kg)	146.6 lbs (66.5 kg)
JA-AL-FB05	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	49.2" (1250 mm)	1.6"x0.3" (40x8 mm)	59.1" (1500 mm)	119.0 lbs (54.0 kg)	125.4 lbs (56.9 kg)
JA-AL-FB06	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	39.4" (1000 mm)	1.6"x0.3" (40x8 mm)	49.2" (1250 mm)	95.2 lbs (43.2 kg)	100.5 lbs (45.6 kg)
JA-AL-FB07	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	29.5" (750 mm)	1.6"x0.2" (40x6 mm)	39.4" (1000 mm)	72.8 lbs (33.0 kg)	77.2 lbs (35.0 kg)
JA-AL-FB08	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	19.7" (500 mm)	1.6"x0.16" (40x4 mm)	29.5" (750 mm)	48.5 lbs (22.0 kg)	50.7 lbs (23.0 kg)

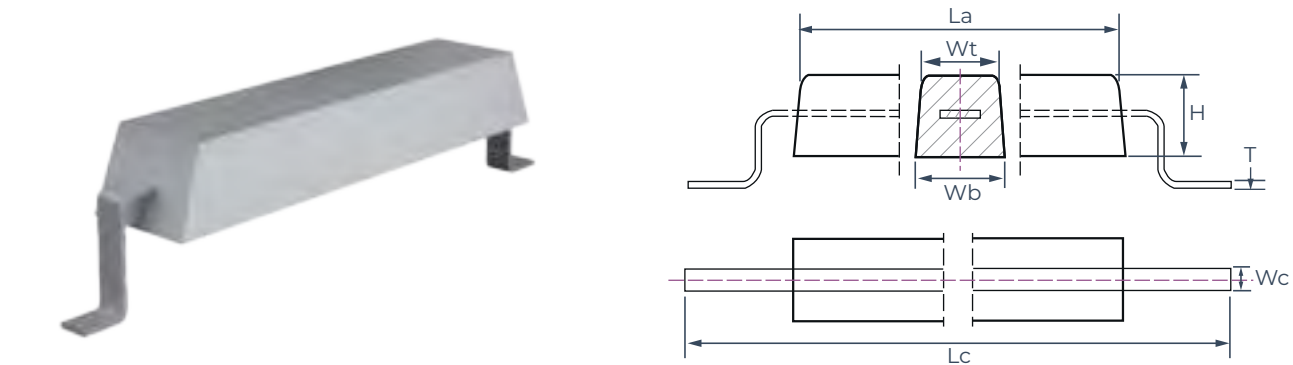
Anode with Steel Solid Rod Insert

Item No.	Anode Dimensions				Insert Dimensions		Weight	
	Wt	Wb	H	La	Dia.	Lc	N.W	G.W
JA-AL-SR01	5.8" (148 mm)	7.0" (178 mm)	6.7" (170 mm)	59.1" (1500 mm)	0.98" (25 mm)	70.9" (1800 mm)	242.5 lbs (110 kg)	257.5 lbs (116.8 kg)
JA-AL-SR02	7.1" (180 mm)	8.7" (220 mm)	7.1" (180 mm)	33.5" (850 mm)	0.98" (25 mm)	43.3" (1100 mm)	179.7 lbs (81.5 kg)	188.5 lbs (85.5 kg)
JA-AL-SR03	7.9" (200 mm)	11.0" (280 mm)	5.9" (150 mm)	31.5" (800 mm)	0.98" (25 mm)	41.3" (1050 mm)	168.7 lbs (76.5 kg)	177.5 lbs (80.5 kg)
JA-AL-SR04	6.3" (160 mm)	8.7" (220 mm)	7.1" (180 mm)	27.6" (700 mm)	0.87" (22 mm)	37.4" (950 mm)	140.9 lbs (63.9 kg)	146.6 lbs (66.5 kg)
JA-AL-SR05	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	49.2" (1250 mm)	0.71" (18 mm)	59.1" (1500 mm)	119.0 lbs (54.0 kg)	125.4 lbs (56.9 kg)
JA-AL-SR06	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	39.4" (1000 mm)	0.71" (18 mm)	49.2" (1250 mm)	95.2 lbs (43.2 kg)	100.5 lbs (45.6 kg)
JA-AL-SR07	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	29.5" (750 mm)	0.63" (16 mm)	39.4" (1000 mm)	72.8 lbs (33.0 kg)	77.2 lbs (35.0 kg)
JA-AL-SR08	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	19.7" (500 mm)	0.63" (16 mm)	29.5" (750 mm)	48.5 lbs (22.0 kg)	50.7 lbs (23.0 kg)

Satnd-Off Aluminum Anodes

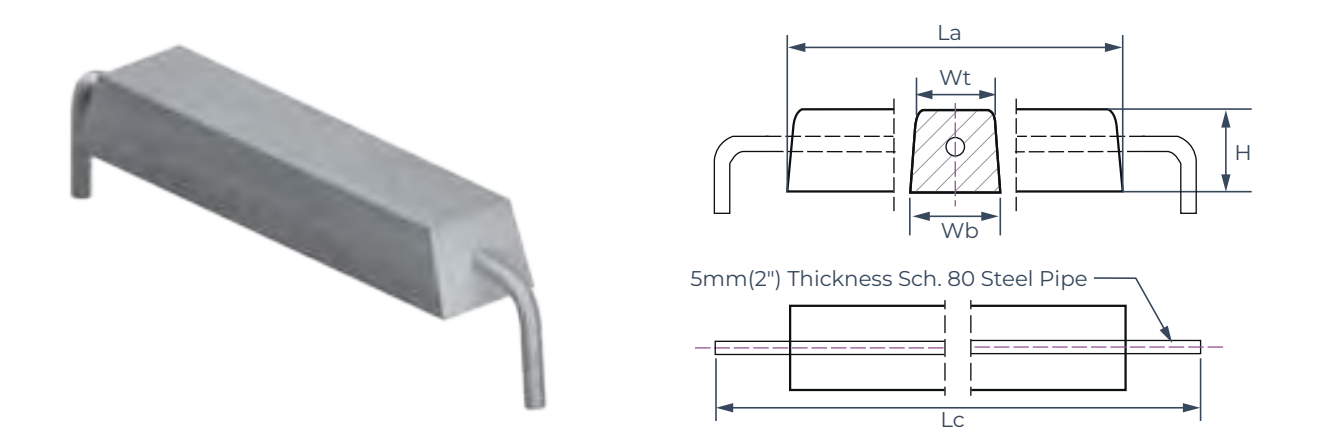


Anode with Cranked Flat Bar Insert
Protruding from Both Ends



Item No.	Anode Dimensions				Insert Dimensions		Weight	
	Wt	Wb	H	La	Wc x T	Lc	N.W	G.W
JA-AL-MSF1	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	19.7" (500 mm)	2.0"x0.16" (50x4 mm)	29.5" (750 mm)	47.6 lbs (21.6 kg)	50.0 lbs (22.7 kg)
JA-AL-MSF2	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	29.5" (750 mm)	2.0"x0.16" (50x4 mm)	39.4" (1000 mm)	71.7 lbs (32.5 kg)	75.0 lbs (34 kg)
JA-AL-MSF3	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	39.4" (1000 mm)	2.0"x0.2" (50x6 mm)	49.2" (1250 mm)	94.8 lbs (43.0 kg)	101.4 lbs (46 kg)
JA-AL-MSF4	4.5" (115 mm)	5.3" (135 mm)	5.1" (130 mm)	49.2" (1250 mm)	2.0"x0.2" (50x6 mm)	59.1" (1500 mm)	118.4 lbs (53.7 kg)	126.3 lbs (57.3 kg)
JA-AL-MSF5	6.3" (160 mm)	8.7" (220 mm)	7.1" (180 mm)	27.6" (700 mm)	2.0"x0.3" (50x8 mm)	37.4" (950 mm)	140.7 lbs (63.8 kg)	146.8 lbs (66.6 kg)
JA-AL-MSF6	7.9" (200 mm)	11.0" (280 mm)	5.9" (150 mm)	31.5" (800 mm)	2.0"x0.4" (50x10 mm)	41.3" (1050 mm)	168.7 lbs (76.5 kg)	177.5 lbs (80.5 kg)
JA-AL-MSF7	7.1" (180 mm)	8.7" (220 mm)	7.1" (180 mm)	33.5" (850 mm)	2.0"x0.4" (50x10 mm)	43.3" (1100 mm)	179.7 lbs (81.5 kg)	188.9 lbs (85.7 kg)
JA-AL-MSF8	5.8" (148 mm)	7.0" (178 mm)	6.7" (170 mm)	59.1" (1500 mm)	2.0"x0.4" (50x10 mm)	70.9" (1800 mm)	242.5 lbs (110 kg)	257.5 lbs (116.8 kg)

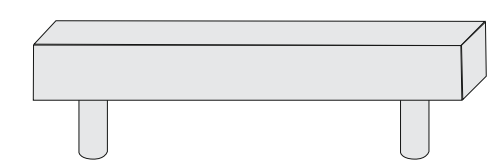
Anode with Cow Horn Tubular Insert
Protruding from Both Ends



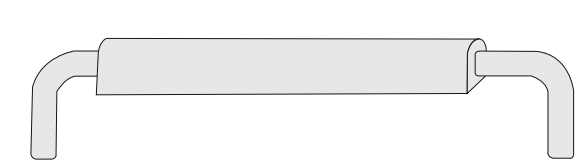
Item No.	Anode Dimensions				Insert Dimensions		Weight	
	Wt	Wb	H	La	Dia.	Lc	N.W	G.W
JA-AL-MST1	5.9" (150 mm)	6.7" (170 mm)	6.3" (160 mm)	35.4" (900 mm)	2.0" (50 mm)	51.2" (1300 mm)	124.6 lbs (56.5 kg)	147.7 lbs (67 kg)
JA-AL-MST2	6.7" (170 mm)	7.9" (200 mm)	7.1" (180 mm)	59.1" (1500 mm)	2.0" (50 mm)	74.8" (1900 mm)	277.8 lbs (126 kg)	308.6 lbs (140 kg)
JA-AL-MST3	7.9" (200 mm)	8.3" (210 mm)	8.7" (220 mm)	63.0" (1600 mm)	2.4" (60 mm)	78.7" (2000 mm)	400.1 lbs (181.5 kg)	440.9 lbs (200 kg)
JA-AL-MST4	8.7" (220 mm)	9.4" (240 mm)	9.1" (230 mm)	90.6" (2300 mm)	3.5" (89 mm)	110.2" (2800 mm)	637.1 lbs (289 kg)	715.4 lbs (324.5 kg)

MORE CONFIGURATION OPTIONS

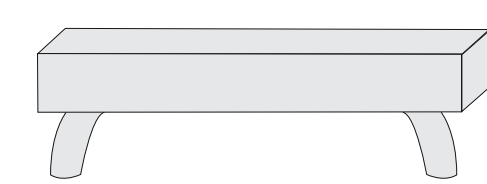
Anode with Goal Post Tubular Insert
Protruding from Back Face



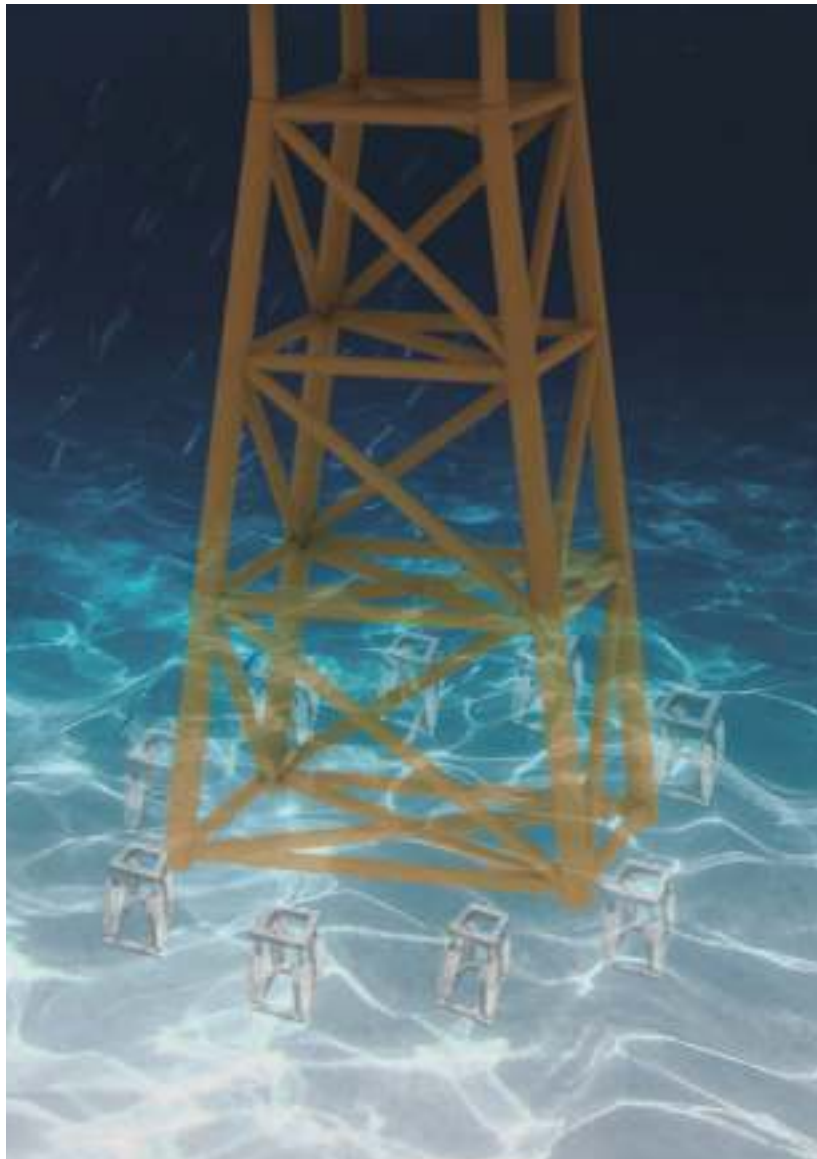
D-section Anode with Cow Horn Tubular
Insert Protruding from Both Ends



Trapezoidal Anode with Cow Horn Tubular
Insert Protruding from Back Face

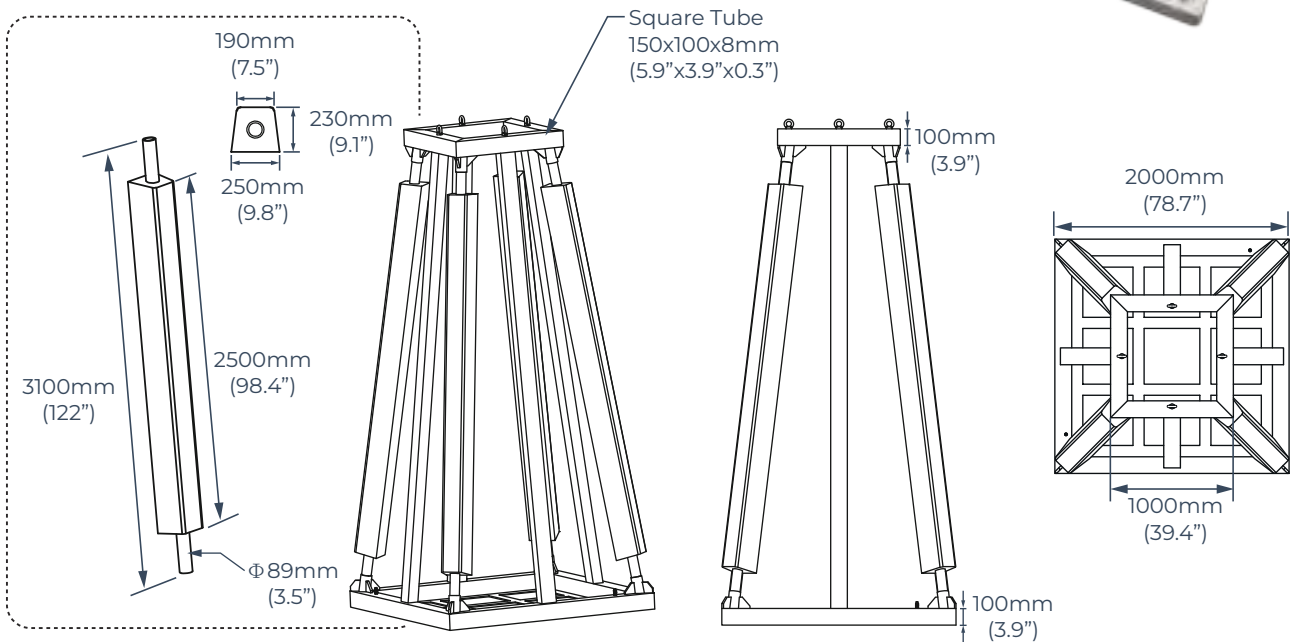


Aluminum Anode Sled

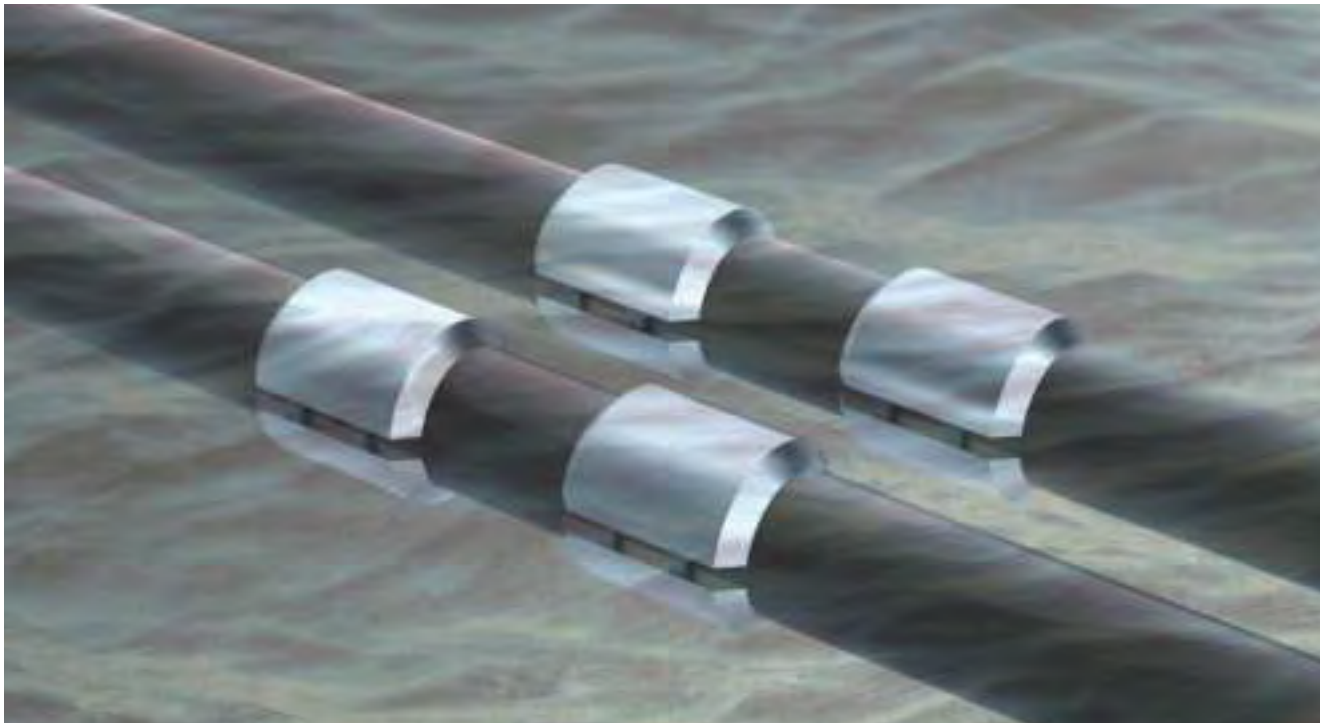


This pyramid aluminum anode is designed for replacing depleted anodes on mature offshore assets. It can be quickly installed by lowering it onto the sea floor.

Compared to underwater welding or other methods of attachment, its speedy installation is incredibly cost-effective. Thus, our anode sled is ideal for anode retrofit projects of subsea equipment and platforms.

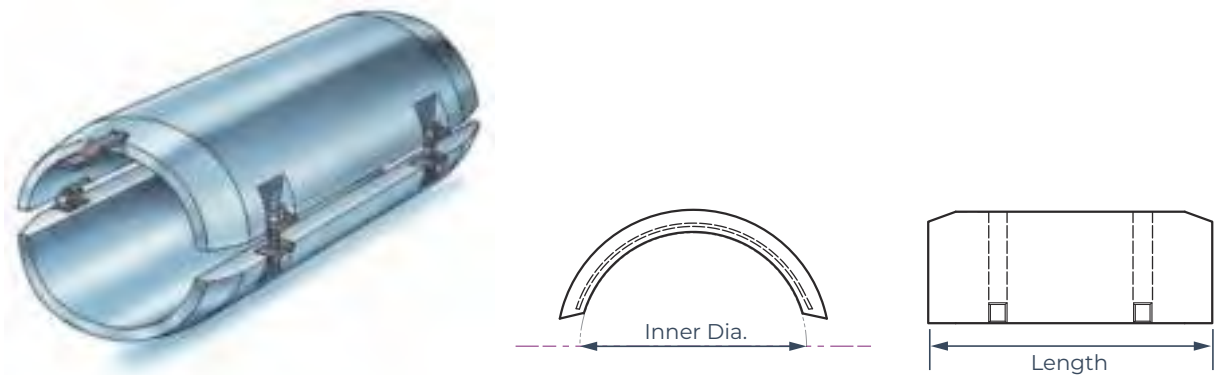


Aluminum Bracelet Anodes



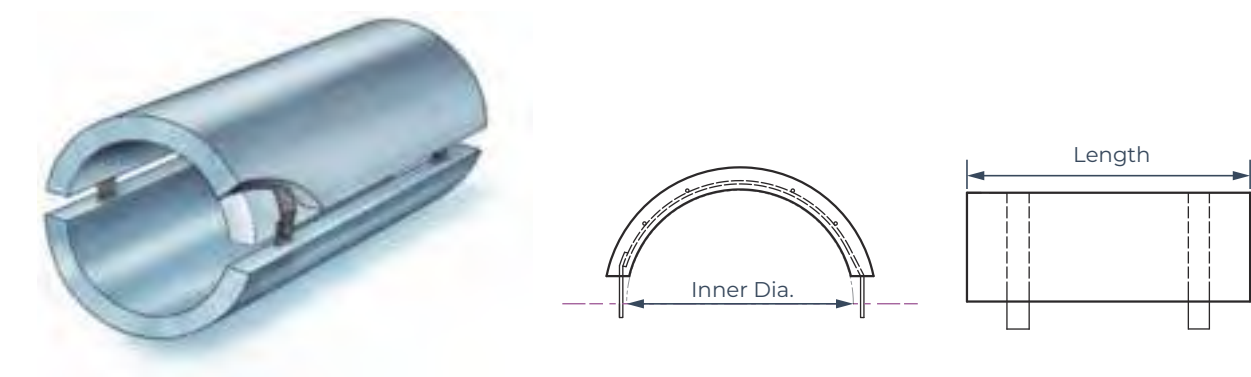
Our aluminum bracelet anodes are specifically cast for cathodic protection of offshore pipelines. The configuration of segmented bracelet anode is available in tapered end and square end.

Half Shell Bracelet Anode (Tapered End, Bolted)



Item No.	Anode Dimensions			Anode Gap	Weight	
	Inner Diameter	Length	Thickness		N.W	G.W
JA-AL-BLB01	4.5" (114 mm)	12.0" (305 mm)	1.5" (38 mm)	2.0" (50 mm)	24.3 lbs (11.0 kg)	27.6 lbs (12.5 kg)
JA-AL-BLB02	5.6" (141 mm)	15.7" (400 mm)	1.5" (38 mm)	2.0" (50 mm)	37.5 lbs (17.0 kg)	41.9 lbs (19.0 kg)
JA-AL-BLB03	8.7" (220 mm)	16.1" (410 mm)	2.6" (65 mm)	2.0" (50 mm)	97.0 lbs (44.0 kg)	101.4 lbs (46.0 kg)
JA-AL-BLB04	10.8" (275 mm)	22.0" (560 mm)	1.8" (45 mm)	2.0" (50 mm)	119.0 lbs (54.0 kg)	125.7 lbs (57.0 kg)
JA-AL-BLB05	12.8" (325 mm)	19.7" (500 mm)	2.0" (50 mm)	2.0" (50 mm)	149.9 lbs (68.0 kg)	165.3 lbs (75.0 kg)
JA-AL-BLB06	16.1" (408 mm)	20.1" (510 mm)	1.8" (45 mm)	2.0" (50 mm)	172.0 lbs (78.0 kg)	186.3 lbs (84.5 kg)

Half Shell Bracelet Anode (Square End, Welded)



Item No.	Anode Dimensions			Anode Gap	Weight	
	Inner Diameter	Length	Thickness		N.W	G.W
JA-AL-BLW01	6.9" (175 mm)	19.5" (495 mm)	1.6" (40 mm)	2.0" (50 mm)	62.8 lbs (28.5 kg)	66.1 lbs (30.0 kg)
JA-AL-BLW02	8.7" (220 mm)	16.3" (415 mm)	1.8" (45 mm)	2.0" (50 mm)	88.2 lbs (40.0 kg)	93.7 lbs (42.5 kg)
JA-AL-BLW03	10.8" (275 mm)	21.7" (550 mm)	2.0" (50.8 mm)	2.0" (50 mm)	137.8 lbs (62.5 kg)	149.9 lbs (68.0 kg)
JA-AL-BLW04	12.8" (325 mm)	18.9" (480 mm)	1.6" (40 mm)	2.0" (50 mm)	112.4 lbs (51.0 kg)	121.3 lbs (55.0 kg)
JA-AL-BLW05	13.2" (336 mm)	31.6" (802 mm)	1.2" (30 mm)	2.0" (50 mm)	121.3 lbs (55.0 kg)	125.7 lbs (57.0 kg)
JA-AL-BLW06	16.0" (406 mm)	13.8" (350 mm)	2.6" (65 mm)	2.0" (50 mm)	178.6 lbs (81.0 kg)	187.4 lbs (85.0 kg)
JA-AL-BLW07	18.0" (457 mm)	21.7" (550 mm)	2.0" (51 mm)	2.0" (50 mm)	275.6 lbs (125 kg)	282.2 lbs (128 kg)
JA-AL-BLW08	20.1" (510 mm)	9.8" (250 mm)	2.6" (65 mm)	2.0" (50 mm)	162.0 lbs (73.5 kg)	177.5 lbs (80.5 kg)
JA-AL-BLW09	21.1" (536 mm)	28.1" (714mm)	1.5" (38 mm)	2.0" (50 mm)	230.4 lbs (104.5 kg)	238.1 lbs (108 kg)
JA-AL-BLW10	24.0" (610 mm)	16.1" (410 mm)	2.0" (51 mm)	2.0" (50 mm)	233.7 lbs (106 kg)	257.9 lbs (117 kg)
JA-AL-BLW11	27.3" (694 mm)	12.6" (320 mm)	1.6" (40 mm)	2.0" (50 mm)	120.2 lbs (54.5 kg)	127.9 lbs (58.0 kg)
JA-AL-BLW12	27.5" (698 mm)	16.0" (406 mm)	2.7" (68 mm)	3.0" (75 mm)	294.3 lbs (133.5 kg)	304.2 lbs (138 kg)

Tips:
The number of segments depends on the diameter of the structure it encloses. The installation could be either weld-on or bolt-on. The electrical connection between the anode and the pipeline is bonding wire, which could be attached by thermite welding or pin brazing.

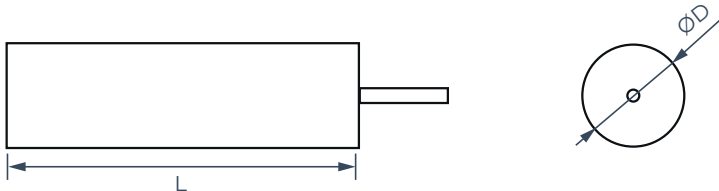
Aluminum Heater Treater Anodes

Aluminum heat treater anodes are sacrificial anodes suitable for installation in heat treaters, pressure vessels and other production vessels. They provide a compact solution for cathodic protection in relatively high temperature and low chloride saltwater environments.

Cylindrical Anode

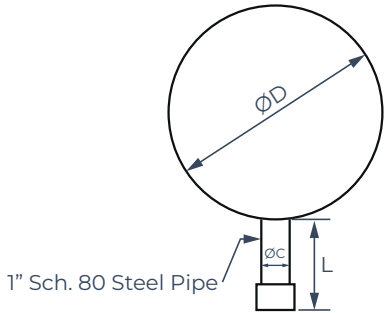


This anode can be assembled with high compression molded fiberglass anode mount caps (blue or red). The red one can be installed in standard 4" SCH 40 fittings with grooved couplings. The blue one can be used for mounting in standard 4" SCH 80 fittings with grooved couplings.



Item No.	Anode Dimensions		Insert Dimensions	Weight	
	ØD	L		N.W	G.W
JA-AL-R30	3" (76 mm)	30" (762 mm)	3/4" - 10UNC	18.5 lbs (8.4 kg)	22 lbs (10 kg)
JA-AL-R60	3" (76 mm)	60" (1524 mm)	3/4" - 10UNC	37.0 lbs (16.8 kg)	44 lbs (20 kg)

Spherical Anode



Item No.	Ball Diameter	Insert Dimensions			Weight	
		ØC	L	NPT	N.W	G.W
JA-AL-B47	9.84" (250 mm)	1.3" (34 mm)	4.0" (102 mm)	1"	47.8 lbs (21.7 kg)	49.5 lbs (22.5 kg)



Zinc Anodes

In certain situations, zinc is far and away the best option as a sacrificial anode, notably when it is docked or anchored in seawater for long periods of time or used in low-resistivity soil environments.

Current will flow at a higher rate through zinc than it does the other metals when subject to the same environment, therefore, limiting electrolysis to zinc alone.

It contributes to a very simple, cost-effective and maintenance-free corrosion control method for buried or immersed metals such as iron, steel, aluminum or copper.

- Zinc Ribbon Anodes
- Zinc Earthing Rods
- High Temperature Zinc Anodes



Made from 99.995% pure high grade zinc, our anodes are produced according to ASTM-B418 Type I / Type II alloy standards. Type I is generally used in brackish water or seawater, while Type II is used in underground and fresh water applications.

CHEMICAL COMPOSITION

Element \ Standard	ASTM-B418 Type I	ASTM-B418 Type II
Aluminum (Al)	0.1% ~ 0.5%	0.005% max.
Lead (Pb)	0.006% max.	0.003% max.
Iron (Fe)	0.005% max.	0.0014% max.
Copper (Cu)	0.005% max.	0.002% max.
Cadmium (Cd)	0.025% ~ 0.07%	0.003% max.
Total Impurities	0.1% max.	0.1% max.
Zinc (Zn)	Remainder	Remainder

ELECTROCHEMICAL PROPERTIES

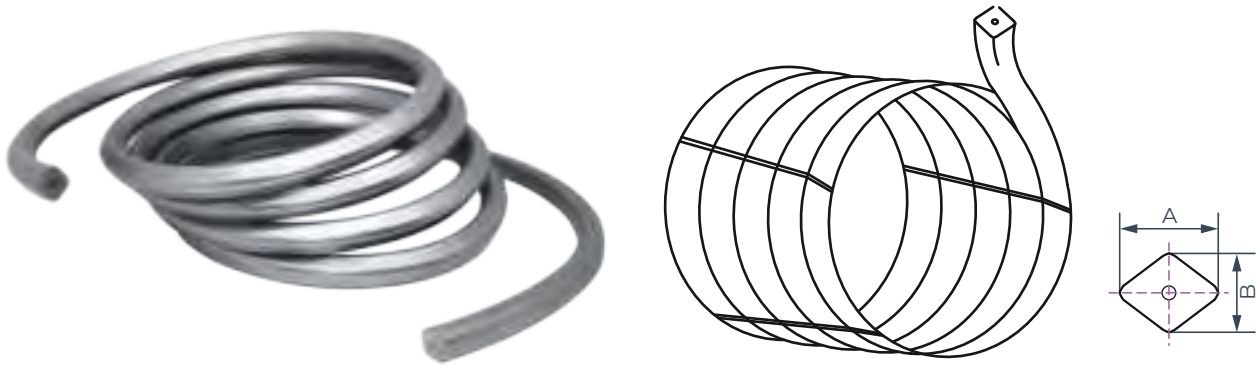
Technical Measurement	ASTM-B418 Type I	ASTM-B418 Type II
Open Circuit Voltage (-V)	1.05 min.	1.10 min.
Closed Circuit Voltage (-V)	1.00 min.	1.05 min.
Current Capacity	354 A.h/lbs (780 A.h/kg)	335 A.h/lbs (740 A.h/kg)
Current Efficiency	95%	90%
Consumption Rate	24.8 lbs/A.y (11.2 kg/A.y)	26.2 lbs/A.y (11.9 kg/A.y)

* The open/closed circuit voltage is with respect to a saturated calomel electrode.

Zinc Ribbon Anodes

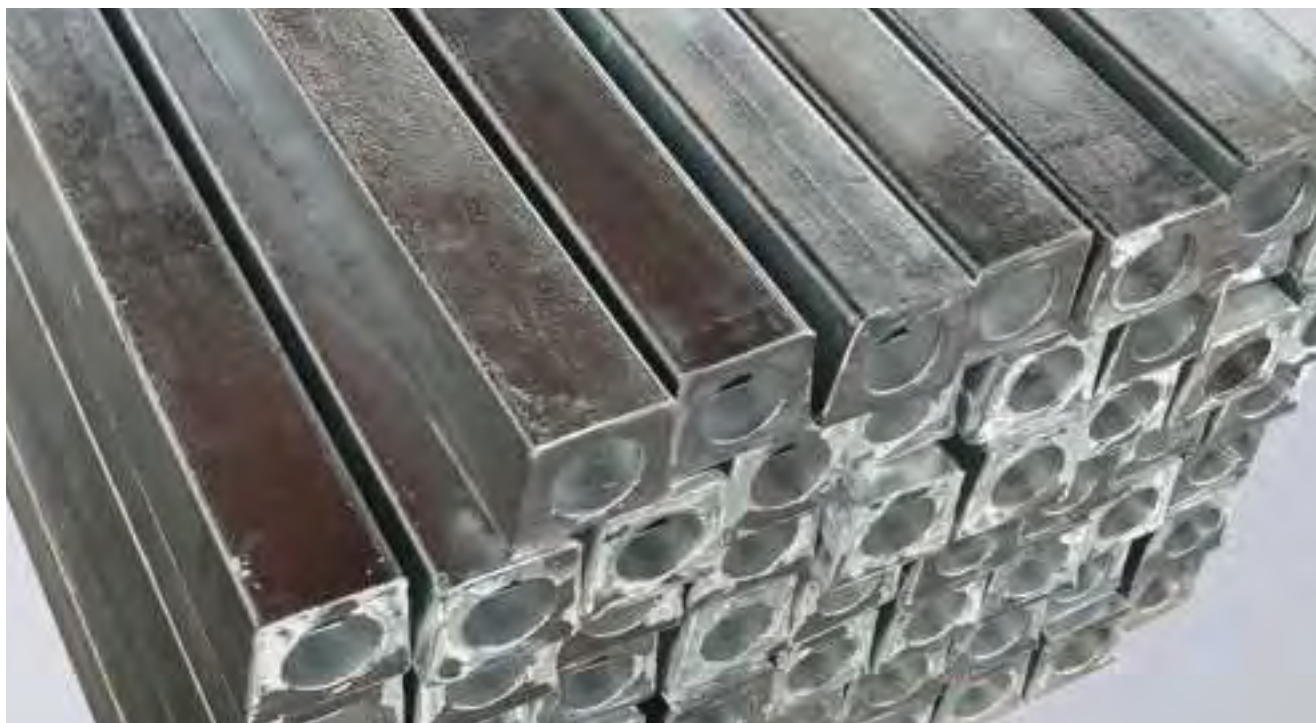


With a steel wire core firmly bonded to the zinc outer shell, our zinc ribbon ensures an even corrosion pattern and reliable electrical efficiency. It is especially ideal for remote applications, wells with limited space between inner and outer casings, or narrow spaces where the anode needs to be wound around the protected structure.



Item No.	Cross Section		Core Diameter	Length	Unit Weight
	A	B			
JA-ZR-Super	1" (25.4 mm)	1 1/4" (31.75 mm)	0.185" (4.7 mm)	100 ft. (30.5 m)	2.4 lbs/ft. (3.57 kg/m)
JA-ZR-Plus	5/8" (15.88 mm)	7/8" (22.22 mm)	0.135" (3.43 mm)	200 ft. (61 m)	1.2 lbs/ft. (1.785 kg/m)
JA-ZR-Standard	1/2" (12.7 mm)	9/16" (14.28 mm)	0.13" (3.3 mm)	500 ft. (152.5 m)	0.6 lbs/ft. (0.893 kg/m)
JA-ZR-Small	11/32" (8.73 mm)	13/32" (10.32 mm)	0.115" (2.92 mm)	1000 ft. (305 m)	0.25 lbs/ft. (0.372 kg/m)

Zinc Earthing Rods



Regarded as an earthing cell, zinc rod is commonly pre-packaged in the cotton bag filled with low resistivity backfill. Typically, two zinc anode units will be packed together — one is connected to the protected structure, and the other is connected to an earthing device.



Item No.	Anode Dimensions			Anode Qty.	Weight (Packaged)
	W	H	L		
JA-ZC-E01	1.4" (35 mm)	1.4" (35 mm)	60" (1524 mm)	2	116.8 lbs (53 kg)
JA-ZC-E02	2.0" (51 mm)	2.0" (51 mm)	60" (1524 mm)	2	202.8 lbs (92 kg)

High Temperature Zinc Anodes

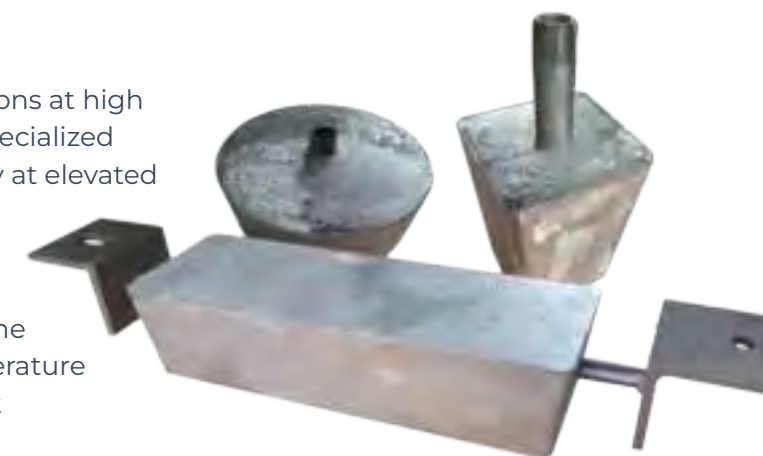


It is known that common zinc alloys have a tendency to fail at temperatures above 60°C. Above this temperature, zinc alloys can suffer from intergranular corrosion, especially when buried in saline mud.

When at high temperature, common zinc anodes may become ineffective or even detrimental to the iron and steel structure intended to be protected by the sacrificial CP system. The zinc anode suffers passivation and polarity reversal — a dangerous condition in which zinc and steel reverse their natural polarity and steel becomes anodic to zinc, corroding itself and protecting the anode.

To meet the demand of anode applications at high temperature, we have developed this specialized zinc anode that can operate successfully at elevated temperatures up to 90°C.

Our high temperature zinc anode is designed for use in tanks intended for the carriage of liquid cargo with high temperature exposure, hot subsea pipelines and heat exchangers.



Temperature	Current Capacity	Closed Circuit Voltage
20°C	800 A.h/kg	-1030 mV
60°C	770 A.h/kg	-1010 mV
80°C	770 A.h/kg	-980 mV
90°C	750 A.h/kg	-950 mV

* The open/closed circuit voltage is with respect to a Ag/AgCl reference electrode.