

ProNode™

MAGNESIUM ALLOY SACRIFICIAL ANODE

PRODUCT DESCRIPTION

Magnesium alloy sacrificial anodes are widely used in cathodic protection systems for buried pipelines, buried metallic structures, and steel structures in freshwater environments. They provide high driving potential, simple installation, and low maintenance requirements when used as part of a properly designed cathodic protection system.

The magnesium alloy sacrificial anodes comply with the latest ASTM B843 and ASTM G97 standards, with 50% efficiency fully guaranteed. Available alloy models include M1C high-potential magnesium alloy and AZ63B standard-potential magnesium alloy. The anodes are available in D-type, S-type, R-type, and specially customized configurations, with an annual production capacity exceeding 5,000 tons.

PRODUCT PERFORMANCE

Driving Potential & Efficiency

- High driving potential, with anode efficiency $\geq 50\%$ for M1C and $\geq 55\%$ for AZ63B.

Environmental Adaptability

- Conductive backfill helps prevent agglomeration under alternating wet and dry conditions, reducing the risk of premature anode failure.

Quality Stability

- Metallographic analysis verifies a uniform internal structure and supports stable performance across production batches.



PRODUCT FEATURES

Backfill & Packaging

- High-conductivity backfill with biodegradable packaging enables direct on-site installation without generating plastic waste.

Structural Design

- Spiral anode structure is suitable for difficult-to-excavate environments and helps reduce construction costs.

Reference	Title
ASTM B843	STANDARD SPECIFICATION FOR MAGNESIUM ALLOY ANODES FOR CATHODIC PROTECTION
ASTM G97	STANDARD TEST METHOD FOR LABORATORY EVALUATION OF MAGNESIUM SACRIFICIAL ANODE TEST SPECIMENS FOR UNDERGROUND APPLICATIONS
EN 12496	GALVANIC ANODES FOR CATHODIC PROTECTION IN SEAWATER AND SALINE MUD
EN 13636	CATHODIC PROTECTION OF BURIED METALLIC TANKS AND RELATED PIPING

PRODUCT QUALITY

Strict Manufacturing

Advance Technology ensures the performance and quality stability of its sacrificial anodes through strict raw material quality control and controlled casting processes. The purity of raw materials directly affects impurity levels and the accuracy of the anode composition, both of which play an important role in anode performance. We use high-purity raw materials and strictly inspect, accept, label, and store each batch in accordance with established quality control requirements.

In addition to precise control of each alloying element, the casting parameters of magnesium alloy sacrificial anodes, such as pouring temperature, mold temperature, and holding time, have a significant impact on the anode’s metallographic structure. This structure, including element distribution and grain size, directly affects anode performance. As shown below, sacrificial anodes with the same composition but produced through a controlled casting process exhibit a more uniform dissolution morphology than those produced through a less controlled casting process (Appendix B, DNVGL-RP-B401). The finer, more uniform grains and denser grain structure achieved through Advance Technology’s controlled casting process promote more uniform anode dissolution. During long-term service, uneven dissolution may lead to localized corrosion, material detachment, and reduced anode utilization. Advance Technology anode products are designed to effectively reduce this risk.

Standardized Process

Advance Technology has established a strict quality management system in accordance with ISO 9001 standards. For sacrificial anodes, a series of quality control procedures has been implemented, including but not limited to:

- Manufacturing Process Specification (MPS)
- Inspection and Test Plan (ITP)
- Production Record Sheet

These quality control procedures are developed in accordance with customer requirements and project specifications, and are verified through pre-production qualification testing (PQT) before full-scale production to ensure consistent performance and quality stability of the sacrificial anodes.

Customized Inspection

Sacrificial anode inspection and testing can be conducted in accordance with relevant international standards, such as DNV-RP-B401, EN 12496, and NACE SP0387, to meet customer requirements and project specifications. Chemical composition and electrochemical performance testing can be performed using samples taken from the melt at the start, middle, or end of each heat, or from finished anodes. Physical property testing can be carried out through either random batch inspection or 100% inspection, depending on project requirements.

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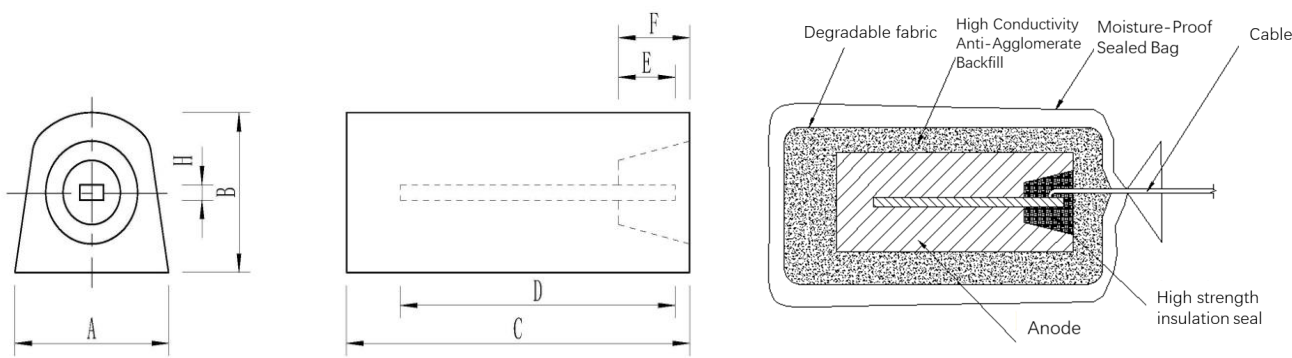
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PRODUCT PARAMETERS

Chemical Composition and Electrochemical Properties						
High Potential Magnesium Alloy Sacrificial Anode				Standard Potential Magnesium Alloy Sacrificial Anode		
Alloy		M1C		Alloy	AZ63B	
Design Requirements	Chemical Composition	Al	≤0.01%	Chemical Composition	Al	5.30-6.70%
		Mn	0.50-1.30%		Zn	2.50-3.50%
		Cu	≤0.005%		Mn	0.15-0.70%
		Si	≤0.05%		Si	≤0.10%
		Ni	≤0.001%		Cu	≤0.02%
		Fe	≤0.01%		Ni	≤0.002%
		Other Impurities (each)	≤0.05%		Fe	≤0.003%
		Other Impurities (total)	≤0.30%		Other Impurities (total)	≤0.30%
		Mg	Remainder		Mg	Remainder
	Electrochemical Properties	Open-Circuit Potential (-V), SCE	1.70-1.75	Electrochemical Properties	Open-Circuit Potential (-V), SCE	1.50-1.55
		Closed-Circuit Potential (-V), SCE	1.58-1.62		Closed-Circuit Potential (-V), SCE	1.45-1.50
		Current Capacity (A.h/kg)	1100		Current Capacity (A.h/kg)	1230
Current Efficiency (%)		50	Current Efficiency (%)		55	

MODELS AND SPECIFICATIONS

D-Type Magnesium Alloy Anode



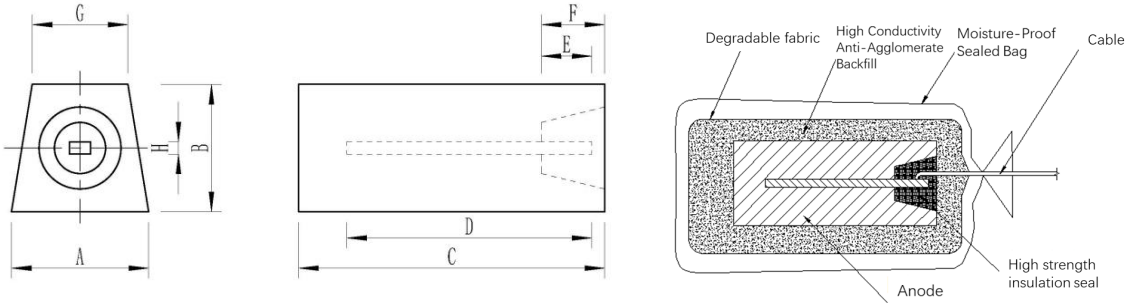
Model	Anode Weight /kg	Packaged Weight /kg	Anode Size /mm								Packaged Size /mm	
			A	B	C		D	E	F	H	I	J
					M1C	AZ63B						
ATMG-9D2	4.1	16	70	76	565	545	500	32	40	1.5	780	130
ATMG-17D3	7.7	25	89	95	590	560	500	32	40	1.5	730	160
ATMG-32D5	14.5	32	140	146	490	460	430	32	40	2.0	600	195
ATMG-48D5	21.8	45	140	146	760	720	610	32	40	2.0	850	195

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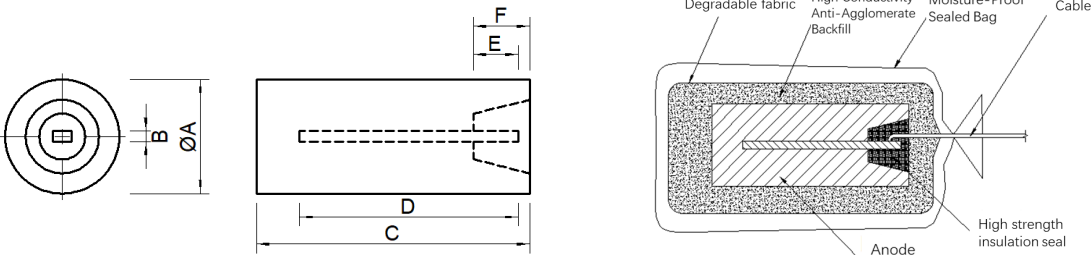
S-Type Magnesium Alloy Anode

Model	Anode Weight /kg	Packaged Weight /kg	Anode Size /mm									Packaged Size /mm	
			A	B	C		D	E	F	G	H	I	J
					M1C	AZ63B							
ATMG-17S3	7.7	25	97	76	615	591	570	32	40	76	2.0	750	160
ATMG-32S5	14.5	32	127	127	541	520	430	32	40	107	2.0	640	195
ATMG-48S5	21.8	45	127	107	840	800	610	32	40	107	2.0	900	195



R-Type Magnesium Alloy Anode

Model	Anode Weight /kg	Packaged Weight /kg	Anode Size /mm							Packaged Size /mm	
			A	B	C		D	E	F	G	H
					M1C	AZ63B					
ATMG-R41	4.1	16	114	2	238	220	195	22	30	420	165
ATMG-R50	5.0	16	114	2	288	275	195	22	30	420	165
ATMG-R77	7.7	25	114	2	440	410	320	22	30	650	165
ATMG-R100	10.0	32	114	2	570	545	430	22	30	540	165
ATMG-R145	14.5	32	146	2	505	475	430	22	30	600	200
ATMG-R227	22.7	50	146	2	790	745	600	22	30	900	200



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