

Magnesium anode is the most common used anode for soil application. The most negative potential of magnesium anode will result of highest driving voltage which enable to protect steel structure at medium - high soil resistivity (1.000 – 10.000 Ω -cm). However, magnesium also can be used at sea water, if fast structure polarization is required. It also can be used at fresh water, especially if the resistivity is higher than 500 Ω -cm.

ALLOYS

There are two common magnesium anode available : standard magnesium alloy and high potential (high purity) magnesium alloy. High potential alloy is having higher (more negative) potential compare to standard alloy. Therefore, it is capable to be used at high soil resistivity environment. Otherwise, at same soil resistivity value, high potential alloy is having of higher driving voltage and therefore also higher current output. This is enable of longer protection range area but shorter anode life time compare to the standard alloy.

APPLICATION

The choice of anode material is also depend on the environment resistivity. In soil and brackish water with high resistivity value, only magnesium anode might assure a complete anti-corrosive protection, due to its greatest driving potential. Depending on the soil resistivity, the choice of the sacrificial anode is as follows:

Anode Material	Soil Resistivity (Ω .cm)
Zinc + Backfill	≤ 1.500
Magnesium (Standard) + Backfill	1.000 ~ 4.000
Magnesium (HP) + Backfill	1.000 ~ 10.000

SHAPE

Anode's shape is vary depend on its application, however, the most common available anode shapes are as follows:

UNDERGROUND APPLICATION

- Cylinder/"D" c/w Cable (Bare/Pre-packaged)
- Ribbon

AQUEOUS APPLICATION

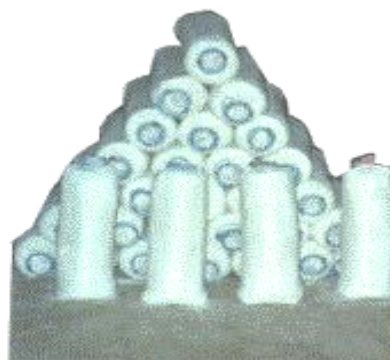
- Rectangular/Rod with Bolted Core
- Rectangular/Rod with Cranked Core Stand Off, etc.

COMPOSITION & ELECTROCHEMICAL PROPERTIES

SPECIFICATION	MAGNESIUM STANDARD	MAGNESIUM HIGH POTENTIAL
Composition (%)		
Aluminium (Al)	5.3 – 6.7	0.01 max
Zinc (Zn)	2.5 – 3.5	–
Manganese (Mn)	0.15 – 0.70	0.50 – 1.3
Silicon (Si)	0.10 max	0.05 max
Copper (Cu)	0.02 max	0.02 max
Iron (Fe)	0.003 max	0.03 max
Nickel (Ni)	0.002 max	0.001 max
Other Impurities	0.30 max	0.30 max
Magnesium(Mg)	remainder	remainder
Efficiency (%)	min. 55	min. 50
Potential vs Cu/CuSO ₄ (Volt)	-1.50	-1.70
Current Capacity (A-hr/kg)	avg. 1,200	avg. 1,100
Consumption Rate (kg/A-yr)	7.30	7.96



Bare Magnesium Anode



Prepackaged Magnesium Anode

UNDERGROUND ANODE

APPLICATION

In medium to high resistivity soil (1.000 – 10.000 Ω-cm), only magnesium anode is suitable to protect underground/buried steel structure by using sacrificial anode system.

INSTALLATION

Anode is completed with cable, provided for direct thermowelding connection to the structure. The connection point shall be covered with Royston Handycaps. Alternatively, anode's cable can be connected to pipe's cable in an aboveground test station, with or without a shunt resistor.

CABLE

Standard cable size is stranded Cu/XLPE/PVC (N2XY) Red Color 1C-6 sqmm – 3 m length. Other type, size, color, and length of cable will be provided on request.

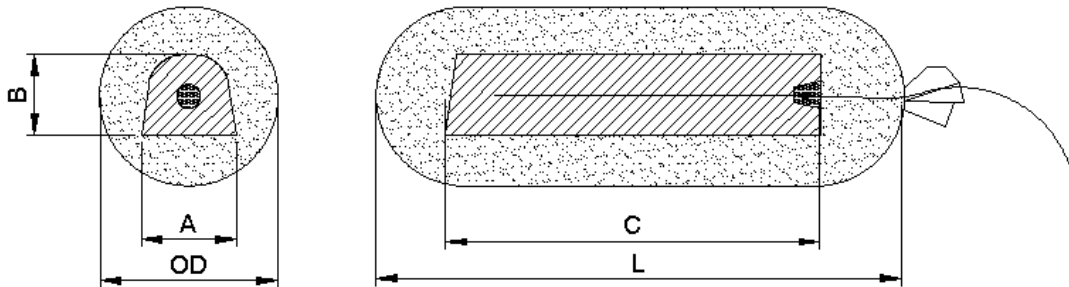
BARE / BACKFILL

Anode can be supplied in bare or complete with rapid wetting backfill of the following composition:

- Powder Gypsum : 75%
- Granular Bentonite : 20%
- Sodium Sulphate : 5%

Anode and backfill are packaged in a cotton bag suitable for direct buried in soil.

D-SHAPE



Type	Dimension (mm)					Weight (kg)		
	Bare			Package (appr)		Bare	Package (Appr)	
	A	B	C		OD			L
			-1.5 V	-1.7 V				
5D	70	76	290	305	120	500	2.3	6
7D	70	76	410	430	120	600	3.2	8
9D-1	63.5	63.5	650	670	130	800	4.1	16
9D-2	70	76	520	550	120	700	4.1	9
14D	70	76	810	850	120	1000	6.35	13
17D	90	95	620	650	150	750	7.7	17
20D	70	76	1240	1260	150	1500	9.5	40
32D	140	145	480	500	200	600	14.5	28
48D	140	145	730	765	220	1000	21.8	45

Round ("R") shape, extruded, and Ribbon shape magnesium are available upon request.