



American Carbon Company has provided the North American market with high quality cast magnesium anodes since 2002. We focus on delivering a high quality anodes that meet or exceed all specifications. Delivery time is a huge concern as well as we understand that lead time is always a concern. Please click on one of the links below to learn more about our Magnesium anodes.

#### **APPLICATIONS:**

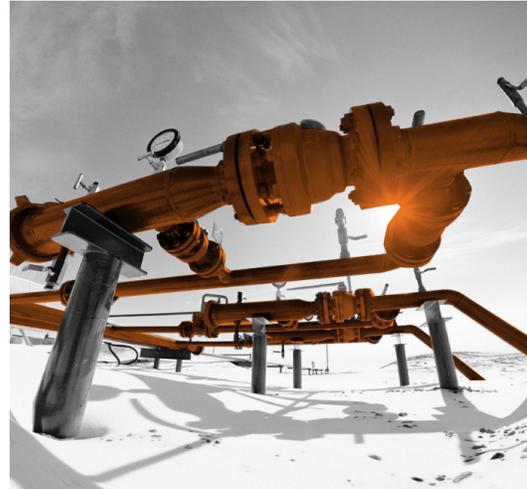
Magnesium anodes are best used in applications where the anode can be easily replaced or the protection is only required for a short time period as in during construction or prior to impressed current cathodic protection being installed. There are three main uses of magnesium for Cathodic protection purposes, and generally speaking all uses fall under these categories.

#### **PACKAGED CAST MAGNESIUM ANODES**

These anodes fit the mold as the traditional magnesium anode. A cast anode has a length of wire soldered to a connection, and the anode is placed in a bag with a gypsum/bentonite backfill material. The entire assembly is then buried and the wire is attached to the equipment to be protected. Magnesium anodes work relatively well in most soil conditions. The backfill mix helps maintain conductivity to the surrounding soil by retaining moisture. Please check with your corrosion engineer as to your specific soil type to ensure the standard backfill mix is appropriate for your application.

#### **STRAP MOUNTED CAST MAGNESIUM ANODES**

These anodes have metal straps cast into the anode and extending out. This allows for a direct mechanical connection to the equipment being protected. These anodes are often used in fresh water waterways on both submerged equipment and vessels.



#### **EXTRUDED MAGNESIUM RODS**

This type of anode is probably most commonly known for its application in the water heater business – as each water heater has a length of extruded magnesium (or aluminum in some instances) in it to prevent the tank from corroding. In larger corrosion applications these extruded rods are used inside of large storage tanks or also in fresh water waterways.

If you wish to learn more about applications for American Carbon Magnesium Anodes, please Contact Us.

#### **CONTACT INFO:**

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## MANUFACTURING PROCESS:

In recent history there have been two primary methods for producing raw magnesium. The first is extraction from saltwater (via electrolysis using the Dow Process). This process was nearly the exclusive source of magnesium until about 2005. Although this process produces a generally more “electrochemically pure” magnesium, it is not currently cost effective when compared to the production method used in China and other parts of the world. According to a current USGS Study, China currently provides over 85% of the world’s magnesium demand.

The process that is used in China to extract the magnesium from the oxide is called the Pidgeon Process. This process starts with mined dolomite.

The dolomite is heated to nearly 1200 degrees in a large rotational furnace. The heating process bakes off much of the gasses and impurities held in the dolomite. From there the dolomite is crushed and mixed with fluoride and crushed ferrosilicon. The resultant powder is formed into charcoal sized briskets which are placed in another furnace where it is heated and the resultant gas is harvested. This gas crystallizes into pure magnesium. The final step is allowing the magnesium to create a magnesium ingot suitable to castings, or many other uses. Since this production method does not produce the most ideal magnesium for anode production, American Carbon only selects the most qualified ingot for production of anodes.

One of American Carbon biggest challenges is educating customers as to the strengths and weaknesses of the Pidgeon Process versus the Dow Process. Producing magnesium via the Dow Process produces magnesium that very easily meets the electrochemical requirements of the ASTM G97 standard for magnesium anodes. The chemical composition of the ASTM B843 alloy however, was always a challenge. This means that for the first 30 years that magnesium anodes were used in cathodic protection, all specifications put the emphasis on the chemical composition. When global magnesium production started switching to the Pidgeon Process in the early 2000s, the specifications all still focused on the chemical composition as well. However the industry quickly found that magnesium anodes were not living up to their expected life.



Further analysis found that the electrochemical properties of the magnesium produced by the general Pidgeon Process was not a suitable for anodes. Now a number of anode manufacturers have developed proprietary methods to ensure the electrochemical property is suitable for anodes, but many do not. This leads to inferior being readily available on the market. As the G97 test for electrochemical performance is much more complex and expensive, many users forego this test. American Carbon recommends a minimum one anode from each order be tested to ensure compliance with the project specifications for electrochemical efficiency.

Using a number of proprietary techniques and processes, American Carbon is consistently one of the top producers of magnesium anodes in the world.

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