AMERICAN CARBON COMPANY

BADGERCONNECT MAGNESIUM ANODES

Technical Publication for: 40-x00 series
ACC Cast Magnesium Anodes

G97 Efficiency Explained

We at American Carbon Company are often asked, what is anode efficiency and why is it important. The answer we always give is simple and consistent: LONG TERM COST SAVINGS. The ASTM G97 test was developed to measure both the open circuit voltage potential and current efficiency of a magnesium anode. Both our high potential and low potential magnesium anodes have a current efficiency greater than 50%. This meets or exceeds the accepted design standard of 50% for current efficiency. The anode current efficiency correlates linearly to anode useful life, a 20% reduction in efficiency from 50% will result in a 20% loss of useful life.

An installed magnesium anode has 2 primary cost components in the eyes of the end user: the anode itself and the cost to install the anode. Using the calculation found in "Peabody's Control of Pipeline Corrosion", we can do a quick cost analysis of an anode that meets the industry design standard and one that does not.

50% Efficient ACC 40-306 17D3 High Potential Anode

Material Costs

Bare Cost of Anode $34.00 ($2.00/lb)
Assembly and Markup by Customer: $20.00
Market Cost of Anode: $54.00

Installation Costs[2]

Installation Cost per Anode: $125.00

Total Cost per Installed Anode[2]

Total Cost per Anode: $179.00

Design Life Calculations[3]

Design Life (years) = (0.116*17*0.5*0.85)/(0.1) = 8.38

38% Efficient Competitor "High Potential" 17D3 Anode[1]

Material Costs

Bare Cost of Anode $33.15 ($1.95/lb — 2.5% initial material cost savings)
Assembly and Markup by Customer: $20.00
Market Cost of Anode: $53.15 (1.5% current material cost savings)

Installation Costs[2]

Installation Cost per Anode: $125.00

Total Cost per Installed Anode[2]

Total Cost per Anode: $178.15 **(Total Cost Savings $0.85/anode or 0.47%)**

Design Life Calculations[3]

Design Life (years) = (0.116*17*0.38*0.85)/(0.1) = 6.37 **(2 year life REDUCTION)**

So, what does this tell us? An end user of a 17D3 high potential anode from American Carbon Company, may pay a very small premium [$0.85 (0.47%) more] per anode, but the anode has an expected life that is 2 years (33%) longer! That is peace of mind.

Be sure to contact American Carbon Company today to learn more about why our magnesium anodes are an industry leader and much more cost effective over the life of the anode today!

1) American Carbon's experiences have shown that this is a common efficiency level from anodes from some of our competitors— some are better and others are worse. This value was chosen for illustrative purposes only, and in no way claims any one manufacturer consistently manufactures anodes of this quality.
2) Based upon a 10 anode groundbed—larger groundbeds will have a lower cost per anode installation cost, while smaller groundbeds will have a higher cost per anode.
3) Based upon the industry standard 85% utilization factor and a relatively standard design current of 0.1 amperes. In this form, this calculation is for High Potential Magnesium Anodes only.

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CONTACT INFO:
P: 877-882-4455
F: 713-513-5799
E: sales@amcarbon.com

AMERICAN CARBON COMPANY
WAUKESHA, WI U.S.A.

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