

# THE DIRT ON GROUND RODS

By Henry Kowalewski, Erico

Choosing the right ground rod can be confusing. There's cost, coating and diameter to consider, among other things. The following ground-rod overview will help you select the right ground rod for your application.

### GROUND ROD MATERIAL

Stainless steel ground rods are generally only used in extremely corrosive soils that are high in sulfides and destructive to galvanized and copperbonded ground rods. The cost of stainless steel rods can be prohibitive for widespread use. More commonly used are copperbonded and galvanized steel ground rods.

Besides price, what really makes these rods different? Both rods are composed of a steel core with a tensile strength ranging from 58,000 psi for galvanized rods to >90,000 psi for copperbonded steel rods. From a theoretical standpoint, the higher the tensile strength, the less likely the rod is to "mushroom" or spread when being driven. Practically speaking, however, any ground rod will mushroom if you hit it without using a drive sleeve.

### GROUND ROD COATING AND SERVICE LIFE

The main difference between the two rods is the thickness and type of material used to cover the steel core. Galvanized ground rods are coated with zinc to a thickness of 3.9 mils or .0039". Copperbonded ground rods are coated with copper to a thickness of 10 mils or .010". The thicker 10 mils coating on the copperbonded rod will provide better corrosion protection and longer service life.

Additionally, copper is inherently more corrosion-resistant than zinc.

Galvanized metal experiences a drop-off in corrosion resistance when placed underground. Comprehensive direct-burial studies done by the National Bureau of Standards showed that 3.9 mils of galvanizing could be expected to provide 10-13 years of protection in most soils. This same study showed that 10 mils of copper could be expected to last more than 40 years in most soil types and is the basis for the 10 mils of copper required for a rod to be UL® Listed. Furthermore, independent ground-rod testing performed by the Navy and the National Electrical Grounding Research Project back up the data gathered by the National Bureau of Standards. Because of these studies, a service life of 10-15 years can be assigned to galvanized rods and more than 40 years for 10-mil copperbonded rods in most soil types.

These results may lead you to believe that copperbonded rods are better than galvanized rods. Sometimes this is true and sometimes not. If the facility being grounded has a life expectancy of less than 15 years, a galvanized ground rod is appropriate and will provide the most cost-effective solution. For installations with a longer service life, copperbonded

ground rods are generally the best fit.

### ROD DIAMETER


The length and diameter of the ground rod not only affect its resistance, but also its driving characteristics. Although larger diameter ground rods do not have an appreciably lower ground-resistance value, they do have a larger steel core that makes them easier to drive in harder soil by providing extra rigidity.

It's probably no coincidence that most rods driven in Canada, with its harder soil, are three-quarter inch in diameter as opposed to 5/8" rods which are more popular in the U.S.


Understanding the characteristics of a ground rod will allow the electrical contractor to make educated buying decisions. Savvy contractors will understand that finding the cheapest way to meet code can end up costing more.

## This device could **SAVE YOUR LIFE**

- 100kA Short Circuit Rated
- NFPA 70E & CSA Compliant
- CSA Switch & hp Rated



Meltric's Deconnector™ Series plugs & receptacles ensure electrical safety even when connected or disconnected under full load conditions. They help users avoid potential arc flash hazards associated with standard pin and sleeve or twist type plugs and receptacles.

  
[www.meltric.com](http://www.meltric.com) • 800.433.7642

Inquire about our  
**Free trial program**