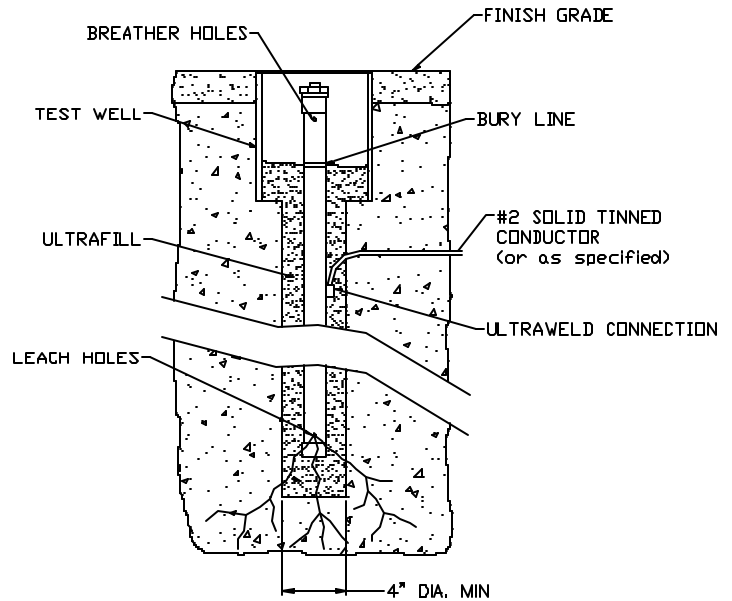


Enhanced Ground Rods

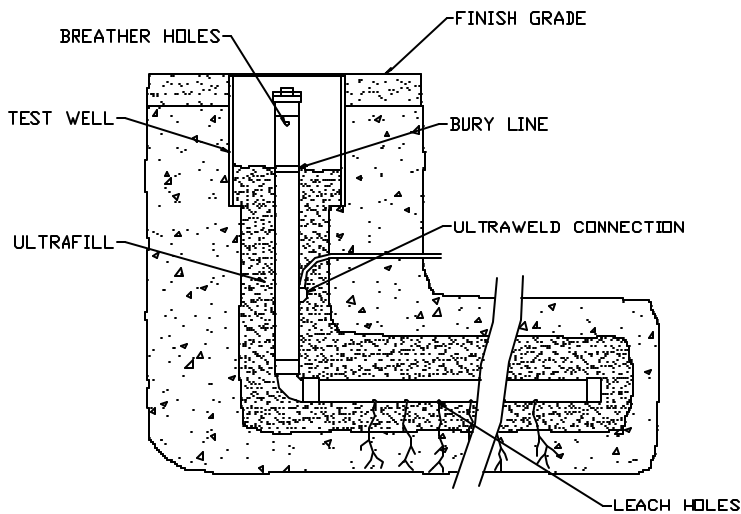
What is an Enhanced Ground Rod?

Simply put, an Enhanced Ground Rod is a conductive hollow tube ground rod, usually manufactured from copper. They contain special hygroscopic, electrolytic salts. These salts form a saline solution by absorbing moisture out of the atmosphere. This saline solution leaches out of the bottom of the rod, which gradually lowers resistivity of the surrounding soil, forming "electrolytic roots" over time.

The salt mixture is critical. Harger utilizes a special combination of Sodium Chloride and Calcium Chloride. Calcium Chloride is an "active" salt, which continually draws moisture out of the air and forms the solution. Many other providers of this type of electrode utilize salts such as magnesium chloride, some even use common water softener pellets. These salts do not draw moisture out of the air, they must be activated by adding water. This may lower resistivity initially, however, unless water is continually added, the salts dry out over time and resistivity of the electrode goes back up.



Vertical



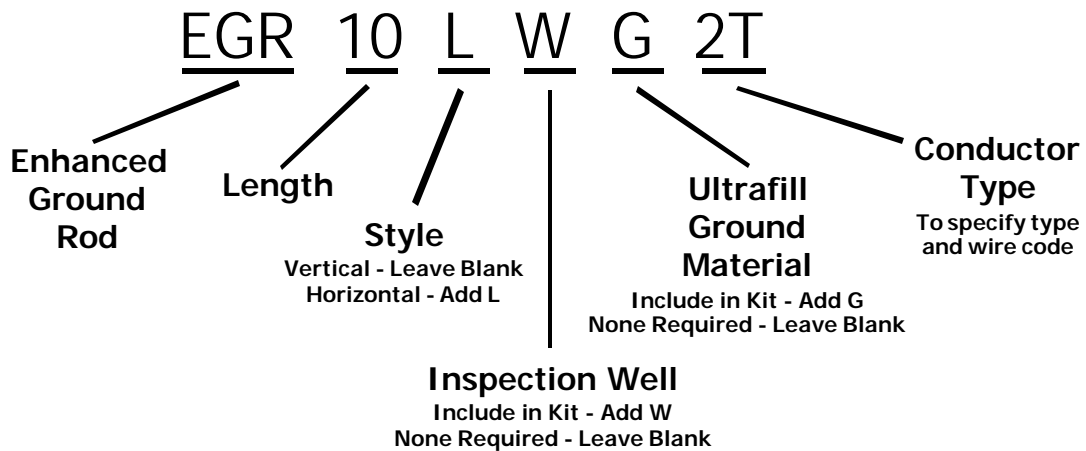
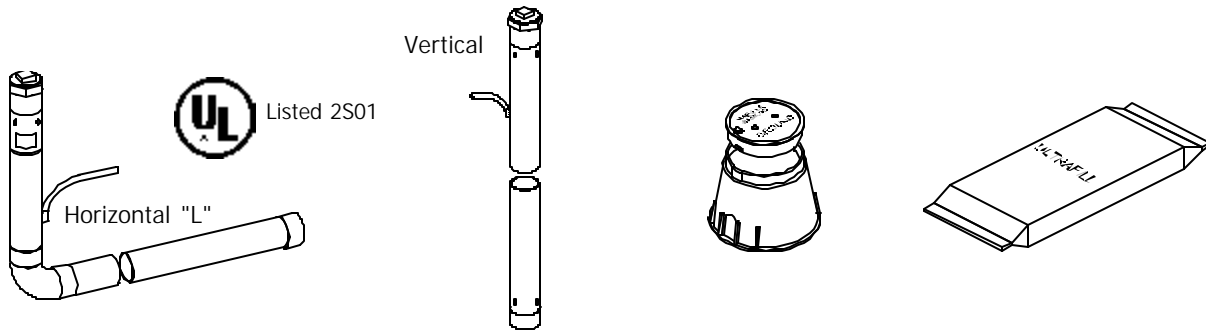
Horizontal "L"

To increase the efficacy of the Enhanced Ground Rod, a very low resistance ground enhancement material is placed around the rod. Harger proudly uses Ultrafill; an ultra-low resistance carbon based material.

Harger exothermically attaches a conductor of your choice to the enhanced ground rod. This conductor is called the tail. The tail direction is very important. Harger provides a design which allows the current, either lightning or electrical fault, to maintain a downward sloping path to ground. Most manufacturers utilize a design which forces lightning to go "uphill" before reaching the ground rod. Some manufacturers claim a superior "x" design. Although at first this sounds good, it causes the contractor to make twice as many connections, thus increasing the cost of installation.

Harger offers two basic styles, vertical and horizontal (L-shaped). We also offer a variety of lengths, sectionals and different kits to meet your specific requirements.

Enhanced Ground Rod Numbering System



The Enhanced Ground Rod Numbering System allows you to customize the product to meet your specific needs. In the above example, the product specified is a 10' long, L-shaped ground rod with a #2 solid tinned 5' tail, 2 - 50 pound bags of Ultrafill and an inspection well. The part number is **EGR10LWG2T**.

TECHNICAL NOTES:

• UL 467 9.2.7 (Summarized)

A hollow-tube, chemically-charged-rod electrode shall:

- a) Be constructed of copper or an equivalent material resistant to the corrosive effects of moist soil;
- b) Have an internal diameter not less than 2 inches and a wall thickness not less than .080 inch; and
- c) If the means of installation is not obvious, be accompanied by adequate installation instructions.

• UL 467 9.2.8 (Summarized)

The chemical charge within the rod electrode described in 9.2.7 shall be a substance that does not cause the electrode to corrode at a faster rate than an electrode constructed of 3/4 inch trade size rigid ferrous metal conduit.

• UL 467 9.2.9 (Summarized)

With reference to 9.2.8, a chemical charge of 60 percent sodium chloride and 40 percent calcium chloride may be used if the total weight of the charge is less than 11 pounds.