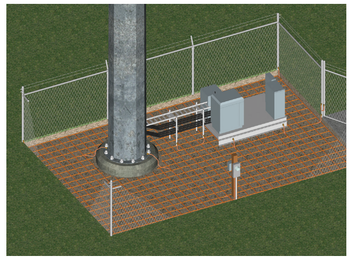
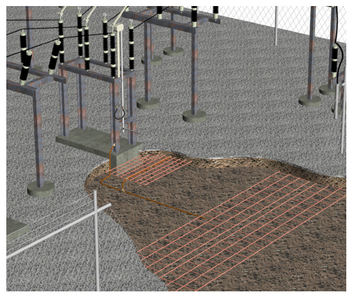
Prefabricated Ground Mesh Mats

Prefabricated wire mesh is a simple cost-effective method of enhancing grounding electrode systems. Applications include improving the ground plane at telecommunications and radio transmitting/receiving facilities and reducing step and touch potentials at power plants and substations. Mesh is also used where ground rods are impossible to drive or are ineffective because of soil conditions.



Wire mesh is manufactured from solid copper or copper clad steel wire, ranging from #10 AWG to #4 AWG. Standard spacing between conductors is 4", 6", 8", 12", 24" and 48". All joints are silver brazed ensuring excellent electrical continuity, corrosion resistance and superior strength.



There are two hazards which can be present to personnel during a fault condition. The first being step potential and the second touch potential. Step potential is the difference in potential experienced by a person bridging a distance of 1m with their feet while not touching any other surfaces. The far more dangerous hazard is touch potential. Touch potential is the difference in potential experienced by a person standing while at the same time having hand contact with a grounded structure.

Substations not only require a properly designed grounding electrode system for clearing of any ground faults but also personnel protection from those faults. Prefabricated Ground Mesh Mats are ideal additions to a substation grounding electrode system.

Part No.	Width (ft.)	Length (ft.)	Conductor Size	Conductor Spacing (in.)
GM125066	12	50	6 AWG	6
GM1250612	12	50	6 AWG	12
GM1250624	12	50	6 AWG	24

- Other sizes available. Please contact factory for more information.
- Maximum mesh width is 20 ft.

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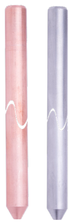
Solid Copper & Stainless Steel Ground Rods

Part No.	Size	Type	Approx. Each Wt. (lbs.)
588C	5/8" x 8'	Solid Copper	10
588SS3	5/8" x 8'	Stainless Steel	9
5810C	5/8" x 10'	Solid Copper	12
5810SS	5/8" x 10'	Stainless Steel	11
3410C	3/4" x 10'	Solid Copper	18
3410SS3	3/4" x 10'	Stainless Steel	15



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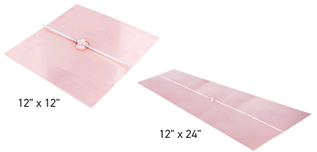
- All rods are full diameter.
- Solid copper ground rods are manufactured from alloy 110 electolytic tough pitch hard temper copper bar.
- Stainless steel ground rods are manufactured from 304 Series Stainless Steel.
- Solid copper ground rods meet ASTM B 133 & B 187.

- Solid copper or stainless steel ground electrodes are used when increased conductivity and corrosion resistance is preferred
- Due to softness of solid copper, care must be taken when driving electrode

NEC Compliant Copper Ground Plates

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP06212122T	12" x 12"	2T	3-1/2
GP06212124/0	12" x 12"	4/0	3-1/2
GP06212242T	12" x 24"	2T	6-1/2
GP06212244/0	12" x 24"	4/0	7



- Copper Ground Plate features a 12" or 24" (depending on the size of the plate) copper conductor exotherically welded to the plate.
- Thickness is .062 inches.

Part No.	Ground Plate Size	Conductor (AWG)	Approx. Each Wt. (lbs.)
GP142424JDP	24" x 24"	4/0	52-1/2

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- 1/4" x 24" x 24" ground plate with zag-zag sheared edges provides 6% more edge surface area than conventional ground plates.
- 5' long 4/0-7 strand tail exothermically welded to center of plate.
- FAA-STD-019f Compliant.

- Copper Ground Plates are used in areas having little or no top soil
- Used to enhance ground grid systems
- Used in conjunction with Ultrafill, ground enhancement material

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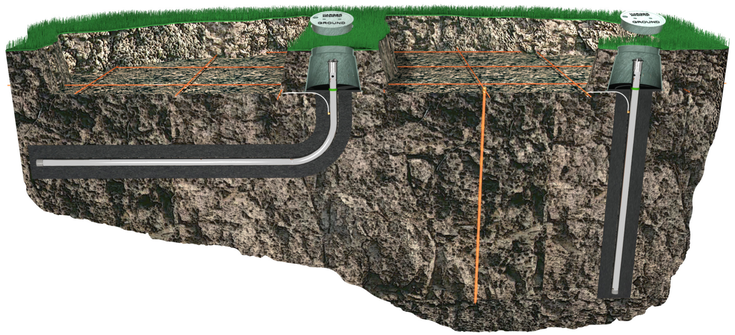


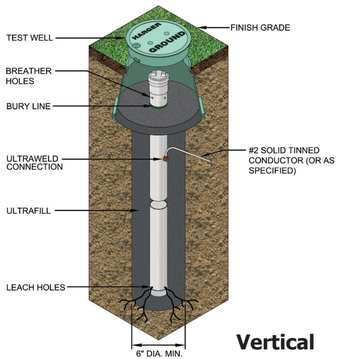
What is an Enhanced Ground Rod?

An Enhanced Ground Rod, (EGR), is a conductive hollow tube ground rod manufactured from 300 stainless steel or copper. These EGR's contain special hygroscopic electrolytic salts which 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.

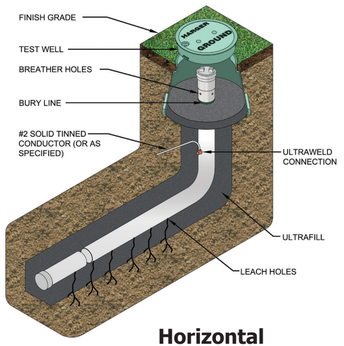
The salt mixture is critical. Harger utilizes a special combination of Magnesium Sulfate and Calcium Chloride. Calcium Chloride is an "active" salt, which continually draws moisture out of the air and forms the solution. Many other providers of this type of electrode utilize salts such as Sodium Chloride, 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. Harger utilizes Magnesium Sulfate, a less corrosive salt, (commonly known as Epsom Salts), to replace the much more corrosive product, Sodium Chloride.

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 an 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.

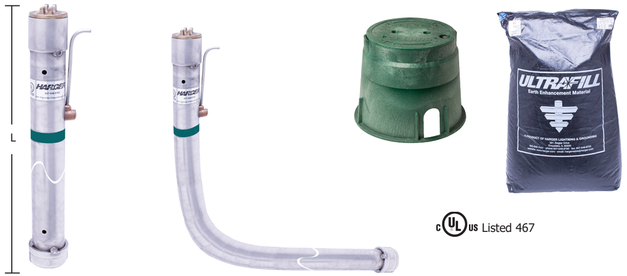


Vertical



Horizontal

Harger offers two basic styles, vertical and horizontal (L-shaped). A variety of lengths, sectionals and different kits are offered to meet your specific requirements.



Vertical Orientation Horizontal Orientation

Vertical Orientation

Part No.	Length	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS8WG2T	8'	5' - #2 Solid Tinned	135
EGRSS8WG4/0	8'	5' - 4/0 Stranded	145
EGRSS10WG2T	10'	5' - #2 Solid Tinned	185
EGRSS10WG4/0	10'	5' - 4/0 Stranded	195
EGRSS20WG2T	20'	5' - #2 Solid Tinned	320
EGRSS20WG4/0	20'	5' - 4/0 Stranded	330

- Manufactured from corrosion resistant 300 series stainless steel.
- Other sizes and conductor configurations available. Contact the factory for details.

Horizontal Orientation

Part No.	Dims. H* x L*	Tail (Conductor) Type (AWG)	Approx. Shipping Wt. (lbs.)
EGRSS8LWG2T	2' x 8'	5' - #2 Solid Tinned	150
EGRSS8LWG4/0	2' x 8'	5' - 4/0 Stranded	160
EGRSS10LWG2T	2' x 10'	5' - #2 Solid Tinned	205
EGRSS10LWG4/0	2' x 10'	5' - 4/0 Stranded	215
EGRSS20LWG2T	2' x 20'	5' - #2 Solid Tinned	340
EGRSS20LWG4/0	2' x 20'	5' - 4/0 Stranded	350

- Manufactured from corrosion resistant 300 series stainless steel.
- Other sizes and conductor configurations available. Contact the factory for details.

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Ultrafill is a low resistance carbon based backfill material, which dramatically lowers ground system resistance in difficult soil situations. Ultrafill does not contain bentonite or concrete components, which, in very dry conditions causes shrinkage around the grounding electrode, thus rendering it ineffective.

Ultrafill is ideal for use in rocky soil, sand, gravel, or any other high resistance soil condition. It is also the ideal backfill material for use around enhanced ground rods and ground grid systems.

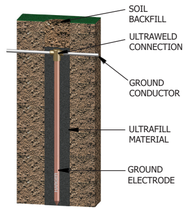
Ultrafill is easy to use, safe and effective. Unlike other backfill products, Ultrafill is relatively dust free and does not require mixing with water prior to installation.

Ultrafill may be either used in a horizontal trench or grid, or in vertical applications. Ultrafill is available in 25 and 50 pound coated woven polypropylene bags.

Part No.	Approx. Wt.
ULTRAFILL25	25 lbs.
ULTRAFILL	50 lbs.

Installation Instructions

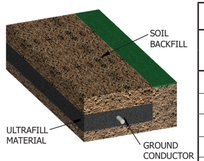
Vertical Applications:
Auger hole to required depth. Insert electrode in center of hole. Pour Ultrafill to proper depth. The chart located to the right will help determine how much Ultrafill will be required.



Pounds of Ultrafill Required Per Foot		
Hole Size	5/8" Ground Rod	2" EGR
4"	3.5	2.7
6"	8.1	7.3
8"	14.5	13.6
10"	22.6	21.8
12"	32.6	31.8

For example, placing a 5/8" x 10' ground rod in a 4" hole would require 35 pounds of Ultrafill. (3.5 x 10 = 35 pounds)

Horizontal Applications:
Pour enough Ultrafill to cover bottom of trench. Place the ground electrode into trench. Pour in additional Ultrafill to cover electrode to the desired depth.



Pounds of Ultrafill Required Per Foot				
Trench Width	Thickness of Ultrafill (Inches)			
	1"	2"	3"	4"
4"	1.2	2.3	3.5	4.6
6"	1.7	3.5	5.2	6.9
8"	2.3	4.6	6.9	9.3
10"	2.5	5.8	8.7	11.6
12"	3.5	6.9	10.4	13.9

For example, using 2" of material in a 6" wide by 10' long trench would require 35 pounds of Ultrafill. (3.5 x 10 = 35 pounds)

Liquid Mixing Instructions:
To mix Ultrafill into a slurry for pumping applications, use the following formula:
6 parts water
1 part bentonite
1 part Ultrafill.

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