

Utility Marking Trace Wire Guide

Manufacture product options:

The information provided by Copperhead Industries gives you product options to help you choose the correct wire – termination points – connectors and grounding products. **SEVERAL MANUFACTURES PROVIDE THESE PRODUCTS; THIS INFORMATION IS ONLY A GUIDE.**

Materials – General

All trace wire and trace wire products shall be domestically manufactured.

All trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

Trace wire – Open Trench

- Trace wire shall be #12 AWG Copper Clad Steel. High strength, totally annealed 1055 steel, part # 1230*HS - break load 452 lb., 30 ml HDPE coating is suggested as minimum thickness.

Trace wire – Directional Drilling/Boring

- Trace wire shall be #12 AWG Copper Clad Steel. Extra High Strength part # 1245*EHS - break load 1,150 lb., 45 ml HDPE coating is suggested as minimum thickness.

Trace wire – Pipe Bursting

- Trace wire shall be #.2403" AWG Copper Clad Steel, totally annealed 1055 steel. Extreme Strength part #PBX-50, 7x7 stranded CCS - break load 4,700 lb., coating thickness 50 ml HDPE.

Connectors

- Direct bury wire connectors, including 3-way lockable connector: SnakeBite 3- way Direct Bury Lug: Copperhead Part # 3WB-01. Main line splice to service line connection shall be specifically manufactured for use in underground trace wire installation, shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- All mainline trace wires must be interconnected in intersections, at tees and crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Using two 3-way connectors with a short jumper wire between them is an acceptable alternative. Copperhead 3-way locking connector: Part # LCS1230*
- Directional drilling and pipe bursting splicing is not allowed on the main line. Intersection splicing will follow guidance for direct bury connectors.

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Termination/Access

All trace wire termination points must utilize an approved trace wire access box (above ground or grade level/in-ground as applicable), specifically manufactured for this purpose. A minimum of 2 ft. of excess wire is required in all grade level trace wire access boxes after setting at final grade.

- Service Laterals on public property - Trace wire must terminate at an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
- Service Laterals on private property - Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the building exterior, directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above grade or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.
- Hydrants – Trace wire must terminate at an approved above-ground trace wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable)
- On long-runs, in excess of 500 linear feet without service laterals or hydrants, trace wire access must be provided utilizing an approved in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The in-ground trace wire access box shall be delineated using a polyethylene marker post, color coded per APWA standard for the specific utility being marked.

Grounding

- Trace wire must be properly grounded at all dead ends/stubs
- Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #14 HDPE copper clad wire connected to anode (minimum 1.0 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility. Drive in Magnesium Anode: Copperhead Part # ANO-1005

Installation - General

- Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- Trace wire system must be installed as a continuous single wire. No looping or coiling of wire is allowed.
- Any damage occurring during installation of the trace wire must be immediately repaired in an approved waterproof method. Taping and/or spray coating shall not be allowed.

- Trace wire on all service laterals/stubs must terminate at an approved trace wire access box directly above the utility, using color coded access boxes, located at the edge of the road right-of-way, but out of the roadway. (See Trace wire Termination/Access)
- All mainline dead-ends shall go to ground using an approved waterproof connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. The anode will be buried on the opposite side of the utility at the furthest most point. The anode wire will be connected in the trace wire access box to the trace wire utilizing the connection point in the access box.
- Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode, buried at the same depth as the trace wire.
- All service lateral trace wires shall be connected to the mainline with a single wire, (no looping will be allowed) using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- In occurrences where existing trace wire is encountered on an existing utility that is being extended or tied into, the new and existing trace wire shall be connected using approved splice connectors, shall be properly grounded at the splice location as specified and be completely waterproof to prohibit corrosion and loss of conductivity.

Installation - Sanitary Sewer System

- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.
- Trace wire on all sanitary laterals must terminate at an approved trace wire access box color coded green and located directly above the service lateral at the road right of way. Follow grounding specification and connections.

Installation - Water System

- Lay mainline trace wire continuously, by-passing around the outside of valves and fittings on the North or East side. Trace wire shall be installed on the bottom half of the pipe.
- Non-Roadway access boxes applications: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP-ADJ 36”
- Concrete / Driveway access box applications: Trace wire access boxes Grade level Copperhead Part # CD14*TP 14”
- Fire hydrant trace wire access box applications: Above ground two terminal with 1” conduit. Copperhead part # T3-75 Ground wire shall be connected to the bottom terminal.
- Tracer wire access boxes will be installed on all fire hydrants included in the project.
- Access box will be securely connected to the fire hydrant, straps or tape will not be allowed.
- Plastic or copper service lines will require a tracer wire. Installation procedures will include taping or tying at 5 ft. intervals.

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Installation - Storm Sewer System

This section shall be included at the discretion of the facility owner.

- If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.
- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.

Prohibited Products and Methods

The following products and methods shall not be allowed or acceptable

- Uninsulated trace wire
- Trace wire insulations other than HDPE
- Trace wires not domestically manufactured
- Twist-on wire connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Brass fittings with trace wire connection lugs
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting trace wire to existing conductive utilities: Explanation, to prevent corrosion at existing grounding options on corps or curb stops or splices. Anode grounding will prevent the wire from corroding.

Testing

All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.

This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

Continuity testing in lieu of actual line tracing shall not be accepted.

Products

The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

- Copperhead Copper clad Steel (CCS) trace wire
- Copperhead connectors

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- Copperhead access boxes

We will continually up-date this specification with pictures and best available information pertaining to installation of trace wire. This specification is utilizing the best available information at this time. Please add your comments if you feel you can improve on what we have in place at this time.